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DXXXII.—HIGHLAND COFFEE OF SIERRA LEONE.

(*Coffea stenophylla*, G. Don.)

With Plate.

The Highland Coffee of Sierra Leone (*Coffea stenophylla*) is an interesting plant, as being, according to the *Botanical Magazine*, t. 7475, "one of the two indigenous West African species* which in point of commercial value may prove a formidable rival of the Arabian coffee." It was discovered by Afzelius upwards of a century ago; but was not published until 1834, when G. Don described it from specimens collected by himself at Sierra Leone. Sir Joseph Hooker remarks:—"It was regarded by Bentham, perhaps rightly, in the 'Niger Flora,' as a variety of *C. arabica*."

The plant is an evergreen shrub or small tree up to 20 feet high; the youngest leaf-shoots are pink. Leaves four to six inches long by one to one and a half broad, bright green and glossy above, paler beneath; nerves, six to ten pairs, with small glands at the axils, which are white, and perforated on the upper surface. Flowers large, white, one to one and a half inches across the corolla lobes. Berry half-an-inch in diameter, globose. Seeds hemispheric, with a narrow ventral furrow.

It owes its name, "The Highland Coffee of Sierra Leone," to Dr. Daniell.

Mr. G. F. Scott-Elliot, F.L.S., the botanist to the Anglo-French Boundary Commission, in 1892, also collected specimens, which are now in the Kew Herbarium. Sir Joseph Hocker remarks that these are of a very slender shape, with lanceolate leaves only two to two and a half inches long by one-third to two-thirds of an inch broad, very different from those represented in the accompanying plate, "and these together favour the opinion entertained by Bentham, that both are forms of *C. arabica*, Linn."

Mr. Scott-Elliot's account (*Kew Bulletin*, 1893, p. 167) is as follows:—

"*Coffee stenophylla*, the narrow-leaved 'wild,' 'bush,' or 'native coffee,' is sometimes found wild in the hills, and is more often cultivated than

* The other is *C. liberica*, Bull.

the Liberian. It grows very freely, and yields quite as much as the Liberian, but is somewhat longer in coming into bearing. Both the natives and French traders at Freetown say that it has a superior flavour, and prefer it to the Liberian. In fact, latterly a certain amount has been exported to a French dealer, who is said to sell it at 4 frs. 50 cents. a lb. as 'best mocha.' Considering that it is worth at Freetown 6*d.* a lb., this should be a fairly profitable trade, and a trial shipment should be made by the English merchants to find out exactly what the market value in Liverpool would be. The plant appears to thrive best in the higher hills about Sierra Leone, on gneissose or granitic soil, and can be grown at from 500 to 2000 feet."

The plant, from which the accompanying plate was produced for the *Botanical Magazine*, was raised at Kew from seed sent in May 1894 by Sir William H. Quayle Jones, late Chief Justice of the West African Settlements and Deputy Governor of Sierra Leone.

The circumstances under which the seed was collected is given in the following despatch communicated to Kew by the Colonial Office:—

DEPUTY GOVERNOR, SIERRA LEONE, to COLONIAL OFFICE.

Government House, Freetown, Sierra Leone,
April 10th, 1894.

MY LORD MARQUESS,

IN reply to your Lordship's Despatch, No. 15, dated the 23rd January last, transmitting a copy of a letter from the Director of the Royal Gardens, Kew, asking that a few pounds of fresh and authentic seed of *Coffea stenophylla* may be obtained and transmitted to him for distribution to the botanic stations in the West Indies, which request your Lordship desired should be complied with if possible, I have the honour to report that on the arrival of Mr. Crowther, the curator of the Gold Coast, in the Colony, I inquired what was being done in the matter, and on learning that it was said to be too late to obtain seed, and as authentic seed was required, and we have no expert in the Colony, I asked Mr. Crowther to be so good as to endeavour to obtain some seed, and if it was not possible to do this now, to be good enough to ear-mark some of the coffee plants of the authentic kind, so as to enable us to supply authentic seed when obtainable.

I am glad to say that Mr. Crowther was able to obtain some of the seed required (nine pounds), which he certifies as true seed, having seen it growing before it was gathered, and also gave instructions for its being packed.

The coffee is being addressed to the Director, Royal Gardens, Kew, and will, if possible, be despatched by s.s. "Sherbro," which takes this despatch.

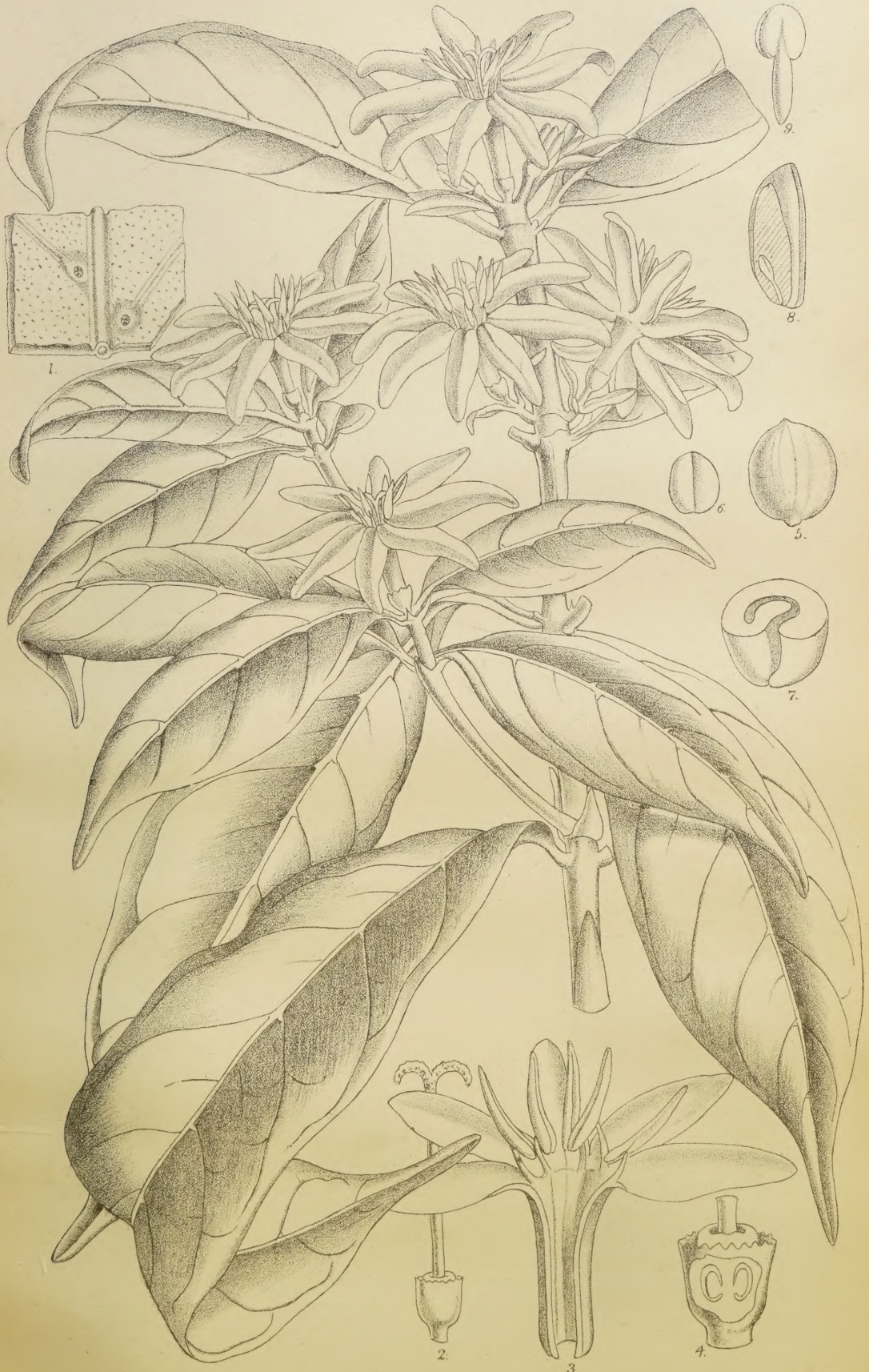
I have, &c.

The Most Honourable
The Marquess of Ripon, K.G.,
&c. &c.

(Signed) W. H. QUAYLE JONES,
Deputy Governor.

Plants raised from the seed, above-mentioned, flowered at Kew as early as September 1895, in one of the tropical houses. Supplies of seed and plants of this coffee have now been distributed to the Botanic Institutions in India and the colonies from whence, if the plant resists the coffee disease and proves to be as excellent a coffee as the French merchants declare it to be, good results may be expected.

The results of the introduction to the West Indies are so far of a promising character. The plants have not, however, thriven so well as could be wished at Dominica and Ceylon. In the *Report* of the Botanic Station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at Dominica for 1895 it is stated :—"A few plants of *Coffea stenophylla* were planted at the station, and twenty plants distributed in couples to various planters who expressed a desire to try them. Some are reported as thriving well; others are not so satisfactory. The plants put out at the station are by no means a success as yet, one only being in a really healthy state."

From Trinidad the prospects are more encouraging. In Mr. Hart's *Annual Report* for 1895 we find :—"From seed of this new coffee, sent from Kew, a number of plants have been raised. Some of the larger plants have been planted in permanent positions, and are now over three feet in height, and it is expected will flower in a few weeks for the first time."

At the Castleton Gardens, Jamaica, Mr. Fawcett is able to report :—"Fifteen plants of *Coffea stenophylla* raised from seeds from Kew, have been planted in different places about the garden and are doing well."

From the *Report* of the Director of the Royal Botanic Gardens, Ceylon, for the year 1895, we learn—

"A small plantation of 36 plants of Sierra Leone or 'upland coffee' (*Coffea stenophylla*) received from Kew in 1894 was made in April, and plants of *Lonchocarpus* sp. (the one used in Trinidad as a shade-tree for Cacao) planted among them for shade. The growth of the coffee plants has been very irregular, varying from a few inches to 3 feet, and cannot be said to be very promising. They have the appearance of plants out of their element, and look as if the climate here did not suit them. On the other hand, the *Lonchocarpus* is certainly at home, having grown very rapidly with a branching habit, and it promises to be a very useful shade-tree at low elevations. Some of the shoots have grown 8 feet in nine months."

The Director of the Botanic Gardens and Forest Department, Straits Settlements, refers to the African coffee in his *Report* for the year 1895, as follows :—

"Among these [economic plants] is a small lot of the new coffee (*Coffea stenophylla*), a plant spoken very highly of. It is growing steadily and well, and at present does not appear to be affected at all by disease. Plants have been distributed to coffee planters in different parts of the Peninsula for experiment and observation."

Explanation of Plate.

Fig. 1, portion of leaf, showing upper surface and glands; 2, ovary, style, and stigmas; 3, portion of corolla with stamens, laid open; 4, vertical section of ovary, exposing ovules; 5, berry (from the Kew Museum); 6, seeds; 7, transverse section of seed; 8, vertical section of seed; 9, embryo. All but No. 5 enlarged.

DXXXIII.—EXPLORATION OF THE KARONGA MOUNTAINS.

An exploration of the Karonga Mountains in North Nyasa within the territory of the British Central Africa Protectorate has lately been undertaken by Mr. Alexander Whyte, the chief of the scientific staff under Sir H. H. Johnston. An account of the botanical work previously done by Mr. Whyte in Nyasaland was given in the *Kew Bulletin*, 1895 (pp. 186–191). The following preliminary report of the results obtained on the Karonga range is contained in a letter from Mr. Whyte,

dated Karonga, the 16th July last, which appears in the *British Central Africa Gazette*, of August 15th:—

I have just returned from my sojourn of eighteen days on the highest range of the Deep Bay-Karonga mountains, and am pleased with the collections made. We all suffered from the cold, and had some bad cases of sickness; but, on the whole, the boys worked well, and I have got together a larger collection than ever I have made on any previous expedition.

The flora of this range proved most interesting, resembling that of Mlanje, yet differing from it, in many respects. I failed to find any trace of a conifer, but, on the other hand, the range is richer in heaths than Mlanje is. I fancy the three principal peaks of the range, to the tops of which I went, rise to an altitude of from 7000 to 8000 feet above sea level; and I thoroughly explored this portion of the range from end to end, and I could see close at hand the mountain I explored at the Mount Waller part of the range. I cannot quote figures exactly till I go thoroughly through my collections; but, of plants, I have over 6000 dried specimens; of skins of kinds, 330; of mammals, 200; of reptiles, &c., in spirits, 120; of crustaceæ, &c., 250; land shells, 5000; insects, 3000, and a collection of geological specimens.

I was much troubled with fever sores breaking out on me while on these high plateaux—if plateaux they can be called; but, luckily, I was able to keep my feet pretty free of them, so was able to get through the walking necessary to explore the place well. I do not think this range of mountains will turn out so healthy as Zomba or Mlanje. There is a want of the soft balmy bracing breezes prevailing at Mlanje. The ordinary wind is a cutting south-easter from the lake, and which we found chilly and anything but bracing. Of course there are sheltered valleys which are pleasant enough, except when the wind is driving over the mountain tops.

I should have stayed a few days longer, but some suspicious natives made their appearance on the plateau, and, in one night, built a long boma, not two miles from my camp, No. 2. Hitherto I had not seen a *trace of man* on the mountains, but saw smoke away down in the valley to the west. About two days from the plateau these unwelcome visitors, whom, I have no doubt, were a party of the Mlozi following, kept on our track when we left, and we had a bit of a scare the first night after leaving, the grass having been set fire to above our camping ground. I was very pleased to get away without a collision with these men. Had they had the pluck to attack us, our carriers would have bolted to a man, and my fine collections been lost, to say nothing of my own fate. The next day we made a forced march and got down on to the plains, reaching Karonga on the third day without further trouble.

Dr. Cross and I propose starting for a tour to-morrow round to the Tanganyika plateau, and returning through the Wankonde country. I do not anticipate great results in collections on this trip, but I shall, no doubt, get something certainly. The steamer is due for me on the 12th August, so I shall do the trip as quickly as possible.

DXXXIV.—NEW ORCHIDS.—DECADES 17–20.

161. **Liparis pauciflora**, *Rolfe*; pseudobulbis ovoideis parvis, foliis binis membranaceis breviter petiolatis late ellipticis obtusis, scapis paucifloris, bracteis late ovato-triangularibus subacutis, sepalis lanceolato-linearibus obtusis lateralibus falcatis, petalis subfiliformibus, labello obovato truncato ecalloso, columnæ alis parvis quadratis.

Hab.—Szechuen: S. Wushan, *A. Henry*, 5675, 5675*a*.

Folia 3–4 poll. longa, 1¼–2½ poll. lata. *Scapi* 7–10 poll. longi. *Bracteæ* ¾–1 lin. longæ. *Sepala* et *petala* 3–4 lin. longa. *Labellum* 3 lin. longum. *Columna* 1½ lin. longa.

Allied to the Indian *L. rostrata*, Rchb. f., but the flowers are smaller and less numerous.

162. **Liparis Henryi**, *Rolfe*; caulibus brevibus, foliis membranaceis breviter petiolatis ovato-oblongis breviter acuminatis, scapis circa 15-floris, bracteis ovatis acutis recurvis, sepalis lineari-oblongis obtusis lateralibus subfalcatis, petalis elongato-linearibus subobtusis, labello obovato obtusissimo denticulato basi bituberculato, columna clavata.

Hab.—Formosa: South Cape, *A. Henry*, 2074.

Folia 3 poll. longa, 1–1¼ poll. lata. *Scapi* 6–7 poll. longi. *Bracteæ* 1 lin. longæ. *Pedicelli* 6–7 lin. longi. *Sepala* 5–6 lin. longa, 1–1¼ lin. lata. *Petala* 5 lin. longa. *Labellum* 4 lin. longum, 3 lin. latum. *Columna* 2 lin. longa.

Allied to *L. acuminata*, Hook. f. from the Khasia Hills. Flowers considerably smaller than in *L. macrantha*, Rolfe, purple, with the front and margin of the lip much paler.

163. **Dendrobium (§ Onychium) hainanense**, *Rolfe*; pseudobulbis gracilibus flexuosis, foliis teretibus subobtusis gracilibus recurvis, floribus axillaribus solitariis pedicellatis, sepalo postico lineari-oblongo acuto lateralibus triangulari-ovatis acutis basi ad pedem decurrentibus mentum curvatum formantibus, petala oblanceolato-linearia acuta, labello unguiculato limbo obovato-oblongo obtuso undulato, disco læviusculo, columna brevissima.

Hab.—Hainan: Lingmen, *A. Henry*; *Ford*, 272.

Pseudobulbi 1–1½ ped. longi. *Folia* 2–2½ poll. longa. *Flores* 8–9 lin. longi. *Sepalum* posticum 2½ lin. longum; lateralia 6–7 lin. longa. *Petala* 2½ lin. longa. *Labellum* 6 lin. longum. *Mentum* 5 lin. longum.

Allied to the Philippine *D. aciculare*, Lindl., but the internodes are shorter, the leaves stouter and more curved, and the petals and lip narrower. The flowers are white with a deep yellow spot on the disc of the lip.

164. **Cirrhopetalum Fordii**, *Rolfe*; rhizomate repente valido, pseudobulbis anguste conicis, foliis petiolatis lineari-oblongis obtusis basi attenuatis, scapis suberectis 6–8-floris, bracteis oblongo-lanceolatis acutis, sepalo postico ovato-oblongo obtuso integro lateralibus lineari-oblongis apice connatis, petalis lineari-oblongis acutis trinerviis, labello recurvo basi cordato apice lineari subobtuso, columna brevi alata apice bidentata dentibus gracilibus acutis.

Hab.—Kwangtung, *Ford*, 359.

Pseudobulbi distantes inter se 1–3½ poll., 1 poll. longi. *Folia* 2½–4½ poll. longa, ¾–1¼ poll. lata; petioli 6–10 lin. longi. *Scapi* 4–4½ poll.

longi. *Bracteæ* 2 lin. longæ. *Pedicelli* 3–4 lin. longi. *Sepalum* posticum 3½ lin. longum; lateralia 6–7 lin. longa. *Petala* 2 lin. longa. *Labellum* 2 lin. longum.

This species much resembles *C. gamosepalum*, Griff., but the dorsal sepal and petals are not strongly ciliate, as in that.

165. **Eria cæspitosa**, *Rolfe;* cæspitosa, pseudobulbis nullis, foliis lineari-lanceolatis minute et inæqualiter bidentatis basi attenuatis carnosis, floribus axillaribus breviter pedunculatis, sepalo postico elliptico-oblongo obtuso lateralibus similibus basi in mentum brevem saccatum extensis, petalis lanceolato-oblongis obtusis, labello trilobo lobis lateralibus semiellipticis obtusis intermedio late cordato-ovato obtuso carnoso, disco bicarinato carinis basi villosis, columna brevissima.

Hab.—Hainan. Living plant received from the Hongkong botanic garden.

Planta circa 2–2½ poll. alta. *Folia* 1¾–2¼ poll. longa, 2–3 lin. lata. *Pedunculi* 5–6 lin. longi. *Sepalum* posticum 2 lin. longum, 1½ lin. latum. *Petala* 1¾ lin. longa, ¾ lin. lata. *Labellum* 2½ lin. longum, 1¾ lin. latum. *Mentum* 1 lin. longum.

An anomalous little species, approaching the section *Bulbodium*, but peculiar in its tufted habit and the absence of pseudobulbs. Sepals and petals white with some maroon-purple stripes at the base; front lobe of lip yellow, angles of side lobes purple. It flowered at Kew in August 1894.

166. **Eria (§ Dendrolirion) formosana**, *Rolfe*; rhizomate scandente crasso, pseudobulbis oblongis 2–3-phyllis, foliis lanceolatis subacutis, racemis arcuatis multifloris rachi ferrugineo-villosa, bracteis ovato-oblongis subacutis, pedicellis ferrugineo-villosis, sepalis lanceolato-oblongis subobtusis ferrugineo-villosis, petalis sepalis paullo angustioribus, labello integro cordato-ovato subacuto subrecurvo, columna brevissima.

Hab.—Formosa: South Cape, *A. Henry*, 1978.

Pseudobulbi 1–1¼ poll. longi. *Folia* 2½–4½ poll. longa; 4–7 lin. lata. *Racemi* 3–3½ poll. longi. *Bracteæ* 2–3 lin. longæ. *Pedicelli* 6 lin. longi. *Sepala* et *petala* 3 lin. longa. *Labellum* 1 lin. longum. *Columna* 1 lin. longa.

167. **Nephelaphyllum chinense**, *Rolfe*; rhizomate repente valido, pseudobulbis cylindraceis, foliis breviter petiolatis ovatis acutis v. breviter acuminatis, scapis erectis 6–8-floris, bracteis ovato-lanceolatis acuminatis, sepalis petalisque lanceolatis acutis, labello suborbiculari obtusissimo obscure crenulato subtrilobo lobis lateralibus parvis apice rotundato-obtusis, disco lævi, calcare oblongo obtuso, columna clavata.

Hab.—Kwangtung: in rupibus ad Tingushan, West River, Canton, *Hance*, 17,733.

Pseudobulbi 1–1½ poll. longi. *Folia* 3½–5½ poll. longa, 1½–2½ poll. lata; petioli 4–5 lin. longi. *Scapi* 5–6 poll. longi. *Bracteæ* 4–7 lin. longæ. *Pedicelli* 3–5 lin. longi. *Sepala* et *petala* 6 lin. longa. *Labellum* 5 lin. longum. *Calcar* 3 lin. longum. *Columna* 3 lin. longa.

Described from a specimen in the British Museum.

168. **Nephelaphyllum cristatum**, *Rolfe*; caule repente radicante vaginis membranaceis laxis tectis, foliis alternis petiolatis cordato-

ovatis subobtusis, scapis laxifloris, bracteis lanceolatis acuminatis, sepalis lineari-lanceolatis apiculatis, petalis sepalis paullo latioribus, labello oblongo obscure trilobo basi saccato-calcarato lobo intermedio semiorbiculari obscure crenulato retuso, disco pubescente prope apicem insigniter fimbriato-cristato, columna clavata, clinandrio late marginato.

Hab.—Hongkong, *Ford*, 48, 254.

Folia 1–2 poll. longa, 7–13 lin. lata; petioli 6–9 lin. longi. *Scapi* 5–10 poll. longi. *Bracteæ* 2–5 lin. longæ. *Sepala* et *petala* 6 lin. longa. *Labellum* 7 lin. longum. *Columna* 3 lin. longa.

Allied to *N. cordifolium*, Lindl., but the crest much more developed. Sepals and petals green streaked with dull purple near the base; lip white passing into purple and then green near the base. A plant flowered at Kew in May 1896.

169. **Tainia hongkongensis**, *Rolfe*; tuberibus ovoideo-globosis, foliis radicalibus longe petiolatis lanceolatis acuminatis, scapis erectis, racemis laxifloris, bracteis lineari-lanceolatis acuminatis, sepalis lineari-lanceolatis acuminatis, petalis sepalis simillimis, labello integro cuneato-obovato apiculato basi breviter saccato-calcarato, disco læviter tricarinato, columna clavata alata.—*Ania angustifolia*, Benth. Fl. Hongk., p. 356 (non Lindl.!).

Hab.— Hongkong, *Wilford*, 384; *Wright*, 522; *Hance; Ford.*

Tubera ¾–1 poll. longa. *Folia* 6–8 poll. longa, ¾–1½ poll. lata; petioli 3–7 poll. longi. *Scapi* 1–2 ped. longi. *Bracteæ* 3–5 lin. longæ. *Pedicelli* 5–7 lin. longi. *Sepala* et *petala* 8–9 lin. longa. *Labellum* 6 lin. longum, 3–4 lin. latum. *Columna* 4 lin. longa.

Easily distinguished from the Indian *T. angustifolia*, Benth. (Ania angustifolia, *Lindl.*), by its entire, not trilobed, lip.

170. **Cœlogyne (§ Pleione) Delavayi**, *Rolfe;* pseudobulbis depresso-globosis nudis, foliis . . . , pedunculis infra medium vaginis membranaceis truncatis obtectis unifloris, bracteis lineari-lanceolatis obtusis, sepalis petalisque anguste lanceolatis subobtusis basi attenuatis, labello late rhomboideo obscure trilobo lobo intermedio fimbriato, disco trilamellato lamellis elevatis irregulariter crenato-dentatis, columna gracili.

Hab.—Yunnan, *Delavay*.

Pseudobulbi 6–10 lin. longi. *Pedunculi* 3–3½ poll. longi. *Bracteæ* 1–1¼ poll. longæ. *Sepala* et *petala* 1½–1¾ poll. longa, 3–4 lin. lata. *Labellum* 1½ poll. longum, 1 poll. latum. *Columna* 1¼ poll. longa.

Allied to *C. bulbocodioides*, Franch., but the flowers larger with broader sepals and petals, and the lamellæ of the lip distinctly toothed.

171. **Cœlogyne (§ Pleione) Henryi**, *Rolfe;* pseudobulbis ovoideis apice attenuatis monophyllis, foliis elliptico-lanceolatis breviter acuminatis apice subobtusis, pedunculis basi vaginis membranaceis obtectis 1–2-floris, bracteis lineari-lanceolatis acutis, sepalis petalisque anguste lanceolatis acutis, labello obscure trilobo lobis lateralibus rotundatis intermedio suborbiculari-oblongo emarginato fimbriato, disco trilamellato lamellis undulatis apice dentatis, columna gracili.

Hab.—Hupeh; South Patung, *A. Henry*, 6068, 6068*a*; Szechuen, *A. Henry*, 8826.

Pseudobulbi 7-8 lin. longi. *Folia* 4–7½ poll. longa, 1–1½ poll. lata. *Pedunculi* 3–6 poll. longi. *Bracteæ* 1–1¼ poll. longæ. *Sepala* et *petala* 1½ poll. longa. *Labellum* 1½ poll. longum, 1¼ poll. latum. *Columna* 1¼ poll. longa.

Larger than the other Chinese Pleiones, and the flowers do not appear in advance of the leaves.

172. **Cœlogyne (§ Pleione) pogonioides**, *Rolfe;* pseudobulbis parvis ovoideis apice attenuatis monophyllis, foliis elliptico-lanceolatis subobtusis, pedunculis basi vaginis membranaceis truncatis obtectis unifloris, bracteis oblongo-lanceolatis subobtusis, sepalis petalisque lanceolatis acutis basi subattenuatis, labello late rhomboideo obscure trilobo lobis lateralibus rotundatis intermedio emarginato fimbriato, disco trilameliato lamellis elevatis irregulariter crenatis, columna gracili. — *Pogonia* (§ *Eupogonia*) *sp.*, Hance in Journ. Bot., 1885, p. 247.

Hab.—Anwhei: wet rocks near Wuhu, at 3000 feet alt., *Bullock* (*Hb. Hance*, 22038); Hupeh: Patung, on high mountains, *A. Henry*, 1473, 3785.

Pseudobulbi 6 lin. longi. *Folia* 1–2½ poll. longa. *Pedunculi* 1–2 poll. longi. *Bracteæ* ½–¾ poll. longæ. *Sepala* et *petala* 1¼–1½ poll. longa, 3 lin. lata. *Labellum* 1–1¼ poll. longum. *Columna* 1–1¼ poll. longa.

Allied to *C. bulbocodioides*, Franch., but the petals are as broad as the sepals, and the keels of the lip distinctly crenate. Mr. Bullock records the flowers as bright scarlet and Mr. Henry as pink; and the latter states that the bulbs are used in medicine, yielding a drug known as "*Pen-mu.*"

173. **Pholidota cantonensis**, *Rolfe;* rhizomate repente valido, basi vaginis spathaceis obtectis monophyllis (an semper?), foliis linearilanceolatis obtusis basi in petiolum brevem attenuatis, scapis ad apicem pseudobulbi immaturi productis basi vaginis imbricatis obtectis, racemis arcuatis circa 12–18-floris, floribus distichis parvis, bracteis ovato-oblongis involutis deciduis, pedicellis gracilibus, sepalis elliptico-oblongis subobtusis valde concavis lateralibus carinatis, petalis ovato-oblongis subacutis, labello cymbiformi obtuso v. fere truncato, disci venis vix incrassatis, columna brevi clinandrio alato.

Hab.—Kwangtung: North River, Canton, *Ford*, 139.

Pseudobulbi ¾ poll. longi. *Folia* 2 poll. longa, 3 lin. lata. *Scapi* 1½–2 poll. longi. *Bracteæ* 2½–3 lin. longæ. *Pedicelli* 1–1¼ lin. longi. *Sepala* et *petala* 1¼–1½ lin. longa. *Labellum* 1¼–1½ lin. longum.

174. **Calanthe arcuata**, *Rolfe;* foliis elongato-lanceolatis breviter acuminatis basi attenuatis, scapis elatis, racemis laxifloris, bracteis lineari-lanceolatis subacuminatis, sepalis lanceolatis acuminatis, petalis linearibus acuminatis, labello fere ad apicem columnæ adnato limbo trilobo lobis lateralibus late oblongis apice dentatis intermedio ovato-trulliformi crenulato-undulato, disco læviter tricarinato, calcare arcuato subclavato, columna crassa.

Hab.—Hupeh: Hsingshan, *A. Henry*, 6514.

Folia 8–12 poll. longa, 1–1½ poll. lata. *Scapi* 1½ ped. longi. *Bracteæ* ½–1 poll. longæ, 1–1½ lin. latæ. *Pedicelli* 8–12 lin. longi. *Sepala* 9–10 lin. longa, 2–2¼ lin. lata. *Petala* 8 lin. longa, ¾ lin. lata. *Labelli*

limbus 6 lin. longus ; lobi laterales 1¼ lin. longi ; intermedius 4 lin. latus. *Calcar* 2 lin. longum. *Columna* 2 lin. longa.

Allied to the Himalayan *C. brevicornu*, Lindl., but the spur more slender and the lip different in structure. The flowers, according to Mr. Henry, are yellow and purple.

175. **Calanthe ensifolia**, *Rolfe ;* foliis ensiformibus acutis angustis erectis, scapis elatis, racemis elongatis multifloris, bracteis linearilanceolatis acutis, sepalis elliptico-oblongis apiculatis subobtusis, petalis elliptico-lanceolatis apiculatis subobtusis, labello columnæ adnato 4-lobo lobis lateralibus obovato-oblongis truncatis v. obtusis intermediis semiovatis obtusis subdivergentibus, crista plurituberculata, columna brevi et crassissima, capsulis elliptico-oblongis brevissime pedicellatis.

Hab.—Hupeh : Chienshih, *A. Henry*, 6005 ; Szechuen : Mt. Omei, at 4500 ft. alt., *Faber*, 945.

Folia ½–1½ ped. longa, 4–6 lin. lata. *Scapi* 2–3½ ped. longi. *Racemi* 5–6 poll. longi. *Bracteæ* 5–12 lin. longæ. *Pedicelli* 2–3 lin. longi. *Sepala* et *petala* 3–3½ lin. longa. *Labellum* 3–3½ lin. longum, 4 lin. latum. *Columna* 1½ lin. longa.

Remarkable for its long ensiform leaves. Flowers yellow, according to Mr. Henry. It much resembles *C. Davidi*, Franch., from Tibet, but the lip is quite different.

176. **Calanthe Hancockii**, *Rolfe ;* foliis longipetiolatis elliptico-lanceolatis breviter et abrupte acuminatis subobtusis leviter undulatis, scapis elatis, racemis arcuatis multifloris, bracteis ovato-lanceolatis acuminatis, sepalis oblongo-lanceolatis acutis, petalis paullo minoribus, labello trilobo lobis lateralibus obovato-oblongis obtusis intermedio obovato-oblongo acuto v. apiculato, disco tricarinato carinis undulato-crenulatis, calcare parvo conico, columna crassa.

Hab.—Yunnan : under shady blocks of rocks at 6600 ft. alt., at Mengtse, *Hancock*, 78.

Allied to *C. striata*, R. Br., but the lip much smaller. Mr. Hancock describes the flowers as yellow.

177. **Calanthe Henryi**, *Rolfe ;* foliis elliptico-v. obovato-lanceolatis breviter et abrupte acuminatis basi attenuatis, scapis elatis, racemis multifloris, bracteis lanceolatis acuminatis, sepalis lanceolatis acutis, petalis sepalis paullo minoribus, labello columnæ omnino adnato limbo trilobo lobis lateralibus divaricatis oblique obovato-oblongis obtusis intermedio oblongo apice dilatato truncato, disco graciliter tricarinato, calcare gracili recto, columna crassa.

Hab.—Hupeh : Changyang, *A. Henry*, 5253 A, 5253 D, 5958 A.

Folia 6–10 poll. longa, 2–2½ poll. lata. *Scapi* 1⅓–2 ped. alti. *Bractcæ* 2–4 lin. longæ. *Pedicelli* 7–10 lin. longi. *Sepala* et *petala* 7–9 lin. longa, 2–3 lin. lata. *Labellum* 5–6 lin. longum. *Calcar* 6 lin. longum. *Columna* 3 lin. longa.

Allied to the Himalayan *C. plantaginea*, Lindl., but the raceme more lax, and the spur shorter. Flowers, according to Mr. Henry, white with a little yellow.

178. **Calanthe lamellosa**, *Rolfe ;* foliis elliptico-v. obovato-lanceolatis breviter acuminatis v. acutis basi attenuatis, scapis elatis, racemis laxifloris, bracteis lanceolatis acuminatis, sepalis lanceolatis acuminatis,

petalis sepalis paullo minoribus, labello columnæ adnato limbo trilobo lobis lateralibus rotundato-oblongis obtusis intermedio suborbiculari obtuso, disco trilamellato lamellis valde elevatis, calcare conico brevissimo, columna crassa.

Hab.—Hupeh : Chienshih, *A. Henry*, 5958.

Folia 9–12 poll. longa, 2–3 poll. lata. *Scapi* 1½ ped. alti. *Bracteæ* 3–5 lin. longæ. *Pedicelli* 9–14 lin. longi. *Sepala* et *petala* 9–10 lin. longa, 2½ lin. lata. *Labellum* 6 lin. longum. *Columna* 2½ lin. longa.

Allied to the Himalayan *C. brevicornu*, Lindl., but readily distinguished by its narrower, more elevated membranaceous lamellæ. Flowers, according to Mr. Henry, white with a little red and yellow.

179. **Eulophia Faberi**, *Rolfe ;* rhizomate repente, tuberibus ovoideo-globosis, foliis . . . , scapis elatis basi vaginis spathaceis obtectis, bracteis ovato-lanceolatis acuminatis, sepalis oblongo-linearibus abrupte apiculatis, petalis sepalis conformibus, labello oblongo trilobo lobis lateralibus truncatis apice obscure crenulatis intermedio late rotundato crispo-undulato, disco trilamellato supra medium irregulariter fimbriato, calcare conico-cylindrico, columna clavata.

Hab.—Hupeh : Lukan gorge, Yangtse-kiang, *Faber*, 56, 946 ; Ichang, *A. Henry*, 494, 3589.

Scapi 1–1½ ped. alti. *Bracteæ* 4–7 lin. longæ. *Pedicelli* ½–1 poll. longi. *Sepala* et *petala* 6–8 lin. longa, 2 lin. lata. *Labellum* 7–8 lin. longum. *Calcar* 3–4 lin. longum. *Columna* 4 lin. longa.

Allied to the Indian *E. campestris*, Wall, but the flowers larger and less numerous, and the spur longer.

180. **Cymbidium Faberi**, *Rolfe ;* foliis elongato-linearibus acutis coriaceis venis prominentibus, scapis suberectis v. arcuatis, racemis sæpissime multifloris, bracteis lanceolatis acuminatis, sepalis linear-lanceolatis acutis, petalis sepalis paullo minoribus, labello trilobo lobis lateralibus erectis semioblongis apice rotundatis intermedio ellipticо-oblongo obtuso undulato minutissime crenulato velutino, disco infra medium bicarinato carinis arcuatis, columna clavata angulis acutis.

Hab.—Chekiang ; Tientai Mt., at 2000 ft. alt., *Faber*, 94 ; Szechuen ; S. Wushan, *A. Henry*, 5515.

Folia 2–2¼ ped. longa, 3–6 lin. lata. *Scapi* 1–2½ ped. alti. *Bracteæ* 5–13 lin. longæ. *Pedicelli* ¾–1½ poll. longi. *Sepala* et *petala* 1¼–1½ poll. longa, 3½–4 lin. lata. *Labellum* 1 poll. longum. *Columna* 8–9 lin. longa.

Allied to the Himalayan *C. cyperifolium*, Wall., but the flowers quite distinct, and the colour yellow, according to Mr. Henry.

181. **Cyrtopera formosana**, *Rolfe* ; per anthesin aphylla, foliis . . . , scapis robustis, racemis multifloris, bracteis lineari-lanceolatis acuminatis, sepalis lanceolato-oblongis acutis lateralibus pedi columnæ insertis, petalis sepalis similibus minoribus, labello trilobo lobis lateralibus rotundato-oblongis obtusis intermedio triangulari-ovato apiculato, disco obtuse tricarinato carinis asperulis, calcare brevi saccato obtuso, columna clavata.

Hab.—Formosa ; South Cape, *A. Henry*, 1974.

Scapi 1–1½ ped. alti. *Bracteæ* 7–9 lin. longæ. *Pedicelli* 3 lin. longi. *Sepala* 7 lin. longa. *Petala* 5 lin. longa. *Labellum* 6 lin. longum. *Columna* 3 lin. longa.

Allied to the Indian *C. bicarinata*, Lindl.

182. **Luisia Hancockii**, *Rolfe;* foliis teretibus rigidis subacutis, racemis brevissimis 2–3-floris, bracteis late triangulari-ovatis subobtusis concavis, sepalis elliptico-oblongis obtusis subconcavis, petalis elliptico-oblongis obtusis planis, labello subcordato-oblongo obtuso v. emarginato, disco leviter 5–7-carinato, columna brevissima.

Hab.—Chekiang: western hills of Ningpo, *Hancock*, 22.

Planta 3–6 poll. alta. *Folia* 2–2½ poll. longa. *Bracteæ* 1 lin. longæ. *Pedicelli* 4 lin. longi. *Sepala* 2½ lin. longa. *Petala* 2½ lin. longa. *Labellum* 2½–3 lin. longum.

Habit of *L. teres*, Blume, but flowers smaller, and lip very differently shaped. Recorded as found growing on a wax-tree (*Stillingia sebifera*) beside the river; very rare.

183. **Sarcochilus hainanensis**, *Rolfe;* caule scandente, foliis lineari-oblongis inæqualiter bidentatis, racemis axillaribus vaginis foliorum perforatis compressis multifloris, floribus sæpissime singillatim evolutis, bracteis distichis conduplicatis acute carinatis subincurvis subacutis, sepalis lineari-lanceolatis caudato-acuminatis, petalis sepalis paullo brevioribus, labello trilobo lobis lateralibus semioblongis apice rotundato-truncatis, intermedio triangulari-ovato subacuto carnoso, disco callo rotundato truncato instructo, sacco rotundato-oblongo, columna brevissima.

Hab.—Hainan. Living plant received from the Hongkong botanic garden.

Folia 3½–4 poll. longa, ¾–1 poll. lata. *Racemi* 2–3 poll. longi. *Bracteæ* 2½–3 lin. longæ. *Pedicelli* 6 lin. longi. *Sepala* et *petala* 1½–1¾ poll. longa. *Labellum* 6 lin. longum.

Allied to *S. Arachnites*, Rchb. f., but the front lobe of the lip distinctly triangular and the side lobes more erect. Flowers light yellow, front lobe of lip white with a few buff markings in the throat and on the side lobes.

184. **Vanda hainanensis**, *Rolfe;* foliis lineari-oblongis obtusis v. acute bidentatis, pedunculis robustis, racemis densifloris, bracteis late ovatis subobtusis, sepalis elliptico-oblongis obtusis lateralibus paullo latioribus, petalis sepalis conformibus basi subattenuatis, labello pandurato-oblongo apice breviter trilobo lobo intermedio oblongo obtuso crasse carnoso subtus infra apicem profunde carinato-lamellato, disco crasse tricarinato, calcare conico subcompresso, columna brevissima et latissima.

Hab.—Hainan, *B. C. Henry*, 37.

Folia 4–7 poll. longa, 6–8 lin. lata. *Racemi* 4–5 poll. longi. *Bracteæ* 2 lin. longæ. *Pedicelli* 9–10 lin. longi. *Sepala* 8 lin. longa, 4½–5 lin. lata. *Petala* 7 lin. longa, 3½ lin. lata. *Labellum* 6 lin. longum, 4 lin. latum. *Calcar* 2½ lin. longum.

The third species of the section *Anota*, a group hitherto only known from the Philippines and Burma. Flowers white and purple; fragrant.

185. **Thelasis hongkongensis**, *Rolfe;* pseudobulbis ovoideo-globosis, foliis lineari-oblongis obtusis, scapis gracilibus basi vaginis clausis

apice ovatis subobtusis obtectis, spicis densifloris, bracteis patentibus v. recurvis ovatis acutis, sepalis carinatis postico ovato-lanceolato subacuto lateralibus lineari-oblongis obtusis, petalis linearibus obtusis, labello lanceolato-ovato acuto tricarinato, columna brevissima, rostello ovato-lanceolato apice bicuspidato.—*Thelasis pygmæa*, Hance in Journ. Linn. Soc., xiii., p. 127 (non Lindl.).

Hab.—Hongkong, *Hance*, 1287; *Ford*, 18.

Pseudobulbi 4–6 lin. longi. *Folia* 1–2 poll. longa. *Scapi* 3–5 lin. longi. *Bracteæ* 1 lin. longæ. *Sepala* et *petala* 1–1¼ lin. longa. *Labellum* 1 lin. longum.

Allied to the Philippine *T. triptera*, Rchb. f., but the bracts much narrower and the flowers smaller.

186. **Galeola Faberi**, *Rolfe;* caulibus altis, vaginis ovatis subobtusis carnosis, paniculis amplis laxis multifloris ferrugineo-tomentosis, bracteis ovato oblongis acutis, sepalis petalisque oblongo-linearibus subobtusis, labello integro elliptico obtuso crispulo-crenulato lateribus inflexis, venis elevatis papilloso-crenulatis.

Hab.—Szechuen: Mt. Omei, at 7000 ft. alt., *Faber*.

Vaginæ ¾–1 poll. longæ. *Bracteæ* 1½–2 lin. longæ. *Pedicelli* 1½ poll. longi. *Sepala* et *petala* 1 lin. longa. *Labellum* 11 lin. longum. *Columna* 5 lin. longa.

Allied to the Himalayan *G. lindleyana*, Rchb. f., but with much narrower segments.

187. **Listera grandiflora**, *Rolfe;* caulibus gracilibus, foliis late cordatis v. ovato cordatis subacutis v. apiculatis, racemis pubescentibus paucifloris, bracteis ovatis acutis, sepalis ovato-oblongis subobtusis concavis, petalis linearibus, labello magno late obcordato nervo medio incrassato, columna arcuata.

Hab.—Hupeh: Fang, *A. Henry*, 6876; Szechuen: Mt. Omei, in dark damp place at 8000–9000 ft. alt., *Faber*, 948.

Planta 9–10 poll. alta. *Folia* 1¼ poll. longa, 1¼–1½ poll. lata. *Racemi* 2½–3 poll. longi. *Bracteæ* 2–2½ lin. longæ. *Sepala* 3 lin. longa. *Petala* 2½ lin. longa. *Labellum* 6 lin. longum, 6 lin. latum. *Columna* 3 lin. longa.

The largest-flowered species in the genus.

188. **Spiranthes exigua**, *Rolfe;* parva aphylla glabra, scapis erectis vaginis laxis subimbricatis obtectis, bracteis oblongo-lanceolatis subacutis, sepalis ovatis subobtusis lateralibus obliquis, petalis oblongis subobtusis sepalis angustioribus, labello basi erecto deinde subito patente integro hastato-oblongo subacuto basi bituberculato, columna brevi incrassata, rostello subulato recurvo.

Hab.—Hupeh, *A. Henry*, 6585.

Herba 2½ poll. alta. *Scapi* 2 poll. longi. *Bracteæ* 2½–3 lin. longæ. *Pedicelli* 2 lin. longi. *Sepala* et *petala* 1¾ lin. longa. *Labellum* 1¾ lin. longum.

A very curious little leafless plant. The minute hastate lobes of the lip are easily overlooked, and the rostellum is curiously recurved at the apex.

189. **Physurus chinensis**, *Rolfe;* caulibus brevibus, foliis subcæspitosis petiolatis ovato-oblongis subacutis membranaceis viridibus, scapis

pubescentibus vaginis paucis obtectis, spicis elongatis multifloris, bracteis lanceolatis acuminatis pubescentibus, sepalo postico erecto elliptico-oblongo subobtuso lateralibus patentibus subobliquis elliptico-oblongis subobtusis, petalis sepalo postico subsimilibus, labello subtrilobo lobis lateralibus erectis parvis intermedio reflexo late ovato subapiculato, calcare conico bidentato, columna brevissima.

Hab.—Kwangtung: Lienchow river, *Ford*, 134, 240. Also cultivated at Kew.

Folia 1¼–4 poll. longa, ½–1¾ poll. lata, petioli ½–1 poll. longi. *Scapi* ¾–1¾ poll. longi. *Bracteæ* 3–5 lin. longæ. *Sepala* et *petala* 2 lin. longa. *Labellum* 2 lin. longum. *Calcar* 1½ lin. longum.

The genus has not hitherto been recorded from China.

190. **Cheirostylis yunnanensis**, *Rolfe;* foliis breviter petiolatis ovatis subacutis petiolis basi laxe vaginatis, scapis pubescentibus vaginis 2–4 spathaceis acuminatis obtectis apice 2–5-floris, bracteis ovatis acuminatis concavis, sepalorum tubo oblongo lobis triangulari-ovatis subobtusis, petalis anguste obovato-oblongis apice breviter et obtuse 2–3-dentatis, labello unguiculato flabellato profunde bilobo lobis irregulariter 5–7-dentatis, columna brevi rostelli lobis falcato-linearibus.

Hab.—Yunnan: shady rocky places at Mengtse, *Hancock*, 25. "Very rare"

Folia ½–1 poll. longa, 4–7 lin. lata; petioli 3–4 lin. longi. *Scapi* 3–7 poll. longi. *Bracteæ* 3–3½ lin. longæ. *Sepalorum* tubus 1¾ lin. longus, lobi 1¼ lin. longi. *Petala* 3½–4 lin. longa, apice 2 lin. lata. *Labelli* unguis 2 lin. longus; limbus 4–4½ lin. latus. *Columna* 1¼ lin. longa; brachia 1 lin. longa; rostelli lobi ¾ lin. longi.

Allied to the Indian *C. flabellata*, Wight, but the flowers are much larger, and the petals much longer than the sepals.

191. **Goodyera Henryi**, *Rolfe;* caulibus repentibus elongatis, foliis ovatis subacutis v. apiculatis 5–7-nervis petiolatis basi in vaginam tubulosam amplexicaulem dilatatis, spicis brevibus multifloris, bracteis lanceolatis v. ovato-lanceolatis acutis, sepalis ovato-oblongis obtusis concavis trinervis, petalis oblongo-lanceolatis subacutis uninerviis, labello ovato obtuso basi concavo-saccato intus fimbriato-villoso, columna brevi, anthera lanceolata, rostello in lobos elongatos diviso.

Hab.—Hupeh: Ichang, *A. Henry*, 6878.

Caules ½–1 ped. longi. *Folia* ¾–1¼ poll. longa, 6–10 lin. lata; petioli 5–6 lin. longi. *Spicæ* 1–1¼ poll. longæ. *Bracteæ* 4–5 lin. longæ. *Sepala* 4½ lin. longa. *Petala* 4 lin. longa. *Labellum* 3½ lin. longum.

Allied to the Indian *G. foliosa*, Lindl.

192. **Habenaria Faberi**, *Rolfe;* parvula, monophylla, tubere globoso, folio sessili lanceolato acuminato, scapis uni- v. bifloris, bracteis ovato-lanceolatis subacutis, sepalis elliptico-oblongis obtusis, labello 4-lobo, lobis oblongis obtusis subæqualibus, calcar clavato, columna brevissima.

Hab.—Szechuen: Mt. Omei on rocks at 9000 ft. alt., *Faber*, 319.

Herba circa 2–3 poll. alta. *Folium* 13 lin. longum, 18 lin. latum. *Bracteæ* 1–1½ lin. longæ. *Sepala* et *petala* 1 lin. longa. *Labellum* 2 lin. longum.

Allied to *H. Pinguicula*, Benth., but the flowers only about a quarter as large.

193. **Habenaria Fordii**, *Rolfe;* foliis radicalibus suberectis oblongo-lanceolatis acutis, scapis elatis, racemis multifloris, bracteis ovato-lanceolatis, acutis, sepalo postico cum petalis in galeam connivente lateralibus patentibus oblique semiovatis acutis, petalis lanceolato-linearibus acutis, labello angusto trifido lobis lineari-filiformibus, calcare elongato apice crassiusculo, columna brevi, processubus stigmaticis porrectis, canalibus antheræ elongatis.

Hab.—Kwangtung, *Ford*, 360.

Folia 9–10 poll. longa, 1½–2¼ poll. lata. *Scapi* 2 ped. alti. *Racemi* 3–5 poll. longi. *Bracteæ* ¾–1½ poll. longæ. *Sepalum posticum* 6 lin. longum; lateralia 6½ lin. longa, 3½ lin. lata. *Petala* 6 lin. longa. *Labellum* 1 poll. longum. *Calcar* 2½–3¼ poll. longum.

Allied to the Indian *H. commelinifolia*, Wall., but the flowers much larger and the leaves not cauline. "Flowers white."

194. **Habenaria Hancockii**, *Rolfe;* foliis caulinis oblongo-lanceolatis acutis, scapis squamis lanceolatis longe acuminatis vestitis, racemis brevibus v. subcapitatis multifloris, bracteis lanceolatis acuminatis, sepalo postico elliptico-ovato obtuso lateralibus falcato-semiovatis subobtusis subcarinatis patentibus v. reflexis, petalis subfalcato-oblongis obtusis subcarinatis, labello profunde tripartito lobis linearibus subacutis lateralibus subpatentibus, calcare filiformi apice clavato, columna brevi, processubus stigmaticis oblongis carnosis, canalibus antheræ elongatis, staminodiis oblongis latis, rostello triangulari tridenticulato.

Hab.—Yunnan: Damp grassy slopes at Mengtse, at 5500–6000 ft. alt., *Hancock*, 85.

Planta 1–1½ ped. alta. *Folia* 1¼–3 poll. longa, 3–6 lin. lata. *Racemi* 1½–2 poll. longi. *Bracteæ* 6–9 lin. longæ. *Sepalum* posticum 2½–3, lin. longum; lateralia 3½ lin. longa, 2 lin. lata. *Petala* 2½–3 lin. longia, 1 lin. lata. *Labelli* lobi laterales 4 lin. longi; intermedius 5½–6 lin. longus. *Calcar* 7–9 lin. longum. *Columna* 2 lin. longa.

Allied to the Indian *H. acuifera*, Wall., but with much longer side lobes to the lip, and a more clavate spur. "Flowers flesh-colour."

195. **Habenaria Henryi**, *Rolfe;* foliis caulinis oblongis v. elliptico-oblongis acutis v. subobtusis, racemis laxifloris, bracteis lanceolatis acutis v. acuminatis, sepalo postico erecto ovato subobtuso concavo lateralibus patentibus oblongis obtusis, petalis oblique ovato-lanceolatis acutis cum sepalum posticum conniventibus galeam formantibus, labello integro carnoso oblongo-lineari obtuso, calcare gracili sæpissime curvato.

Hab.—Shingking: Changpeishan, *James;* Kiangsi: Kiukiang, *Shearer;* Hupeh: Patung, *A. Henry*, 4716, 6148; Kuei, *A. Henry*, 7663; Szechuen: Wushan, *A. Henry*, 7453; Mt. Omei, *Faber*, 941.

Planta 1–1¾ ped. alta. *Folia* 1½–4½ poll. longa, ½–1½ poll. lata. *Racemi* 4–9 poll. longi. *Pedicelli* 4–5 lin. longi. *Sepalum* posticum 2½ lin. longum; lateralia 3 lin. longa. *Petala* 2 lin. longa. *Labellum* 3–4 lin. longum. *Calcar* 5–8 lin. longum. *Columna* 1½ lin. longa.

Allied to *H. Keiskei*, Miq., but taller, and with laxer racemes of smaller flowers.

196. **Habenaria humidicola**, *Rolfe;* foliis radicalibus ternis lanceolato-oblongis subacutis, racemis brevibus laxifloris, bracteis ovato-lanceolatis acuminatis, sepalis ovato-oblongis obtusis, lateralibus deflexis, petalis lineari-oblongis obtusis, labello tripartito lobis lineari-filifor-

mibus, calcare elongato filiformi, columna brevi, anthera brevi canalibus et processubus stigmaticis brevibus.

Hab.—Chekiang: Ningpo Mts., in damp places in the shade of rocks, *Faber*, 200.

Planta 6–7 poll. alta. *Folia* 1½–2 poll. longa, 5–7 lin. lata. *Racemi* 2 poll. longi. *Bracteæ* 2–3 lin. longæ. *Sepala* et *petala* 1½ lin. longa. *Labellum* 2 lin. longum. *Calcar* 4 lin. longum.

Allied to *H. reniformis*, Hook f., but the leaves longer, and the flowers smaller and more slender.

197. **Habenaria omeiensis**, *Rolfe*; foliis caulinis oblongo-lanceolatis v. oblongis breviter acuminatis, racemis laxis, bracteis lanceolatis acuminatis, sepalo postico ovato subacuto concavo lateralibus oblongis obtusis, petalis lineari-oblongis obtusis, labello integro lineari acuminato incurvo, calcare elongato flexuoso, columna brevi, antheræ canalibus contiguis oblongis, processubus stigmaticis subglobosis.

Hab.—Szechuen: Mt. Omei, at 8000 ft. alt., *Faber*, 951.

Planta 1¾ ped. alta. *Folia* 2–6 poll. longa, ½–2½ poll. lata. *Racemi* 4 lin. longi. *Bracteæ* ½–1½ poll. longæ. *Sepala* 3–4 lin. longa. *Petala* 2½–3 lin. longa. *Labellum* 7 lin. longum. *Calcar* 1–1¼ lin. longum. *Columna* 2 lin. longa.

Allied to the Indian *H. latilabris*, Hook. f., and *H. stenantha*, Hook. f., but having a more lax raceme of larger flowers.

198. **Diplomeris chinensis**, *Rolfe*; tubere ovoideo-globoso, caule abbreviato monophyllo, folio lanceolato acuto basi attenuato, scapis gracilibus glabris unifloris, bractea oblongo-lanceolata subacuta concava, sepalo postico ovato-oblongo obtuso lateralibus obliquis late semiovatis obtusis, petalis obliquis latissime semiovatis brevibus apice rotundato-obtusis, labello obovato-orbiculari trilobo basi breviter et latissime unguiculato lobis late obovatis truncatis v. emarginatis, calcare elongato basi inflato-conico apice gracili, columna lata.

Hab.—Chekiang: Tientai Mt., on damp rocks at 1000 ft. alt., *Faber*, 95.

Tuber 5–7 lin. longum. *Folium* ½–2½ poll. longum, 2–6 lin. latum. *Scapus* 2–4 poll. longus. *Bractea* 2–3 lin. longa. *Sepala* 3 lin. longa; posticum 1½ lin. latum; lateralia 2 lin. lata. *Petala* 2 lin. longa, 2¼ lin. lata. *Labellum* 6–8 lin. longum. *Calcar* 8–11 lin. longum. *Columna* 1½ lin. longa.

Remarkable for the inflated base of the spur.

199. **Hemipilia Henryi**, *Rchb. f. ex. Bur. et Franch. in Journ. de Bot.* 1891, *p.* 152 (*nomen tantum*); tubere oblongo, caule abbreviato monophyllo, folio sessili cordato-ovato apiculato, scapis glabris, racemis multifloris, bracteis oblongo-lanceolatis acuminatis, sepalis ovato-oblongis obtusis lateralibus subobliquis, petalis oblongis subobtusis, labello obovato subquadrilobo lobis rotundatis v. obtusissimis, calcare basi crasso apice gradatim attenuato, columna lata.

Hab.—Hupeh: Ichang, *A. Henry*, 1534; Nanto, *A. Henry*, 6347; Hsingshan, *A. Henry*, 6347 A.; Fang, *A. Henry*, 6347 B.

Tuber ¾–1 poll. longum. *Folium* 1½–4 poll. longum, 1–2¾ poll. latum. *Scapus* ½–1 ped. altus. *Bracteæ* 3–5 lin. longæ. *Pedicelli* 6–9 lin. longi. *Sepala* 3½–4 lin. longa, 2 lin lata. *Petala* 2½–3 lin.

longa, 1 lin. lata. *Labellum* 6–7 lin. longum, 5–6 lin. latum. *Calcar* 6–9 lin. longum. *Columna* 1 lin. longa.

Differs from *H. flabellata*, Bur. et Franch., in its much larger flowers, independently of structural characters.

200. **Cypripedium ebracteatum**, *Rolfe;* herba diphylla, caule nano, foliis latissime ovato-orbicularibus subacutis, scapis minutissime puberulis unifloris, flore ebracteato, sepalo postico elliptico-ovato subacuminato, lateralibus omnino connatis ovato-lanceolatis acuminatis, petalis lanceolatis acuminatis, labello elliptico-oblongo obtuso saccato, staminodio ovato-oblongo, capsula oblonga glabra.

Hab.—Hupeh, *A. Henry*, 1404*a*.

Folia 4–4½ poll. longa, 3½–4 poll. lata. *Scapus* 6–8 poll. longus. *Sepala* 1 poll. longa; posticum ¾ poll. latum; lateralia 5 lin. lata. *Petala* 1 poll. longa, 3 lin. lata. *Labellum* ¾ poll. longum. *Staminodium* 2 lin. longum. *Capsula* 1¼ poll. longa, 5 lin. lata.

A remarkable ebracteate species, differing from *C. micranthum*, Franch., in its much larger flowers, and from *C. margaritaceum*, Franch., and *C. Fargesii*, Franch., in its saccate lip. The only specimen seen is at the British Museum, having been distributed with *C. japonicum*, Thunb.

DXXXV.—KAPOK.

Kapok is the Dutch name for the seed hairs of the white silk-cotton tree of the East Indies (*Eriodendron anfractuosum*). The kapok of Java is regarded as the best. It is, however, too short in the staple, too smooth, and too soft to be spun into yarn. Its chief use is for stuffing pillows, mattresses, and sofas, where its lightness, immunity from moth, softness, and elasticity, render it superior to all but the best qualities of feathers, wool, and hair.

Eriodendron anfractuosum is a lofty forest tree with a large straight trunk covered with prickles when young. The branches are horizontal and arranged in whorls. The rather large flowers are white, and are followed by a dry, green capsule, in shape like a short cucumber, filled with black seeds embedded in silky hairs. The seeds are sometimes eaten and yield a bland, fatty oil. The residual cake makes an excellent food for cattle. The tree occurs in the forest throughout the hotter parts of India and Ceylon and extends to Sumatra, Java, and the Philippine Islands. It is also distributed to South America, the West Indies and tropical Africa. The habit of the tree is a very striking one. This is well shown in the representations of it in the North Gallery, Nos. 129, 176, and 632. It is majestic in size, and generally towers above all other trees in the dry forests where it flourishes. It sends out large buttress-like expansions from the base, while its branches afford a favourite resting place for numerous epiphytes. In fact the upper parts of an old silk-cotton tree form a very interesting garden. The branches and forks are thickly covered with the large tufted growth of several species of *Tillandsia*, numerous ferns, aroids, orchids, and the seedlings of *Ficus* and other trees whose seeds have been carried thither by birds. Next to the Cocoa-nut palm the silk-cotton tree affords one of the most characteristic features of tropical vegetation. It is regarded

with superstition by the negroes both in Africa and the West Indies, and they can with difficulty be induced to cut it down or handle it.

In India the tree yields an almost opaque gum of a dark-red colour, which is said to be astringent, and to be employed medicinally in bowel complaints. The wood is soft and used in tanning leather. An inferior reddish fibre is sometimes prepared from the bark, which is used locally for making ropes and paper. It possesses, however, no commercial value; and the barking of the tree would not compensate for the injury done to it as a source of floss. The young roots are also used medicinally in Bombay. They are dried in the shade, powdered and mixed with the juice of the fresh bark and sugar.

In Java the growing silk-cotton trees are commonly used as telegraph posts as the branches grow so conveniently at right angles to the trunk that they do not interfere with the wires.

The kapok or floss from *Eriodendron anfractuosum* is, according to present demand, a fibre of considerable merit. The modern trade in it was created by the Dutch merchants, who drew their chief supply from Java. It is said that its elasticity and harshness prevent its becoming matted as in some other flosses. The extending use of kapok seems to point to it as a fibre likely to increase in demand year by year. It is important, as pointed out by Dr. Watt, to guard against an error "made by many writers of viewing kapok as a generic trade name for all the silk-cotton—including that of the *simal*—the floss of *Bombax malabaricum*. When the demand for kapok first started, Indian exporters placed in the market a quantity of very dirty *simal*, having a large percentage of dust as well as seed. This was at once condemned and fetched a price that would not cover the transport charges. India thus fell into an inferior position, which might have been avoided if carefully cleaned fibre had been sent to Europe."

In the *Annual Report* of the Director of the Botanical Department, Jamaica, for the year 1884, p. 48, the following particulars were given respecting kapok or silk-cotton:—

The silk-cotton tree is a very familiar object in the Jamaica landscape, especially on the north side, where it attains an enormous size. The wood was formerly (and sometimes is now) utilised for the purpose of making canoes; but for all practical purposes the tree is accounted of little value in the West Indies.

The chief supply of kapok for the Dutch market is obtained from the East Indies, and during the years 1877–82 the following quantities were imported, viz.: 1877, 14,093 bales; 1878, 10,519 bales; 1879, 12,050 bales; 1880, 6479 bales; 1881, 9991 bales, and 1882, 28,032 bales. The average price paid in English money was 7*d.* per lb. nearly.

A great difficulty found in the importation of silk-cotton was due to its great bulk and the heavy cost of transport. This difficulty has now been overcome by a silk-cotton press constructed by Stork and Co. at Henglo.

It now only remains for some enterprising firm to initiate the collection of silk-cotton in Jamaica and ship it in well packed bales for the European market. If each cotton tree yielded at the rate of about 100 lbs. weight of clean floss there might be exported from Jamaica every year about 3000 bales of silk-cotton of the value of 9000*l.*

In Ceylon, according to the *Tropical Agriculturist* (1884, p. 153), kapok was collected throughout the villages in the interior, principally

in the Matura and Tangalla districts and in the Central Province. The season commences in May, and only one crop can be obtained in the year. The trees do not attain maturity until the fifth year. It is not uncommon to gather 1000 to 1500 pods from one tree. In preparing the article for export the chief difficulty was experienced in freeing it from the seeds. The improved Patent Saw Cotton Gin imported in 1884 was very satisfactory. The industry in Ceylon was started in consequence of letters written from the Melbourne Exhibition by the late Mr. A. M. Ferguson, C.M.G.

Kapok had already attracted considerable attention in Australia. Messrs. Buchanan, of Melbourne, in their *Monthly Register* dated 21st June 1886, gave the following account of it:—"It is now 15 years since the first shipment of Java kapok came to this market . . . . but so firmly did it establish itself . . . . that when supplies were not regularly forthcoming a substitute was sought for. In proof of the lasting qualities of kapok, a non-commissioned officer engaged in the Mahratta war of 1843 has a pillow-case in constant use ever since which still retains its elasticity and fulness, and who assures us he has found nothing so cool or healthful to sleep on in warm climates. It is difficult to obtain reliable statistics concerning the trade . . . We find it entered at the local Customs under all manner of names, such as 'vegetable fibre,' 'vegetable wool,' 'silk cotton,' 'tree cotton,' 'raw cotton,' and 'Simoul cotton.' There were imported into Melbourne during the year 1886 a total of 8845 bales of the value of 26,850*l.* A bale of Java kapok weighs about 80 lbs., a bale of Ceylon about 200 lbs., and a bale of India about 400 lbs."

Serious complaint is made in Australia and elsewhere of the quality of the kapok shipped from India. "Even at the low price of India kapok it is found better to pay 8½*d.* and higher per lb. for Javan than 3*d.* for Indian. The Indian is frequently received in such a filthy condition as to be almost unsaleable." It is stated that hydraulic or steam-press packing of kapok tends to destroy that peculiar elasticity to which it owes its value, "for without its springy nature it is unsuitable as a stuffing material." Moreover, by hard packing, when the seeds are left attached to the fibre, a dark coloured oil is expressed which is suffused over the kapok, "hence a noticeable difference in colour between the Indian and the beautifully white Java products."

"At Java the trade has assumed a uniform practice. No unclean stuff is shipped, but the different grades of cleaning denote standards of quality; the first, 'extra cleaned,' being cleaned by machinery, and the first picking of the crop; the second, denoted as 'best cleaned picked,' being all hand-picked and free from seeds, except an odd one here and there; the third is simply designated 'cleaned.' It contains a few seeds, together with the 'slubs,' or little knotty, curly lumps, which are cast aside from the higher grades. The quality of any one class is found most uniform throughout the bales. Packing is all done in straw mats, and never tightly pressed; the first quality, 'extra cleaned,' weighing about 65 lbs.; the second and third from 75 lbs. to 90 lbs. Bales over 90 lbs. to 95 lbs., on account of having to be dumped by machinery, destroying the elasticity of the fibre, are reckoned not to be worth within ½*d.* to 1*d.* per lb. in value of bales of lesser weight.

"In fact, it is a peculiar feature of the Java trade that weight of bales form an essential condition of price—the lighter the highest, and *vice versâ*."

The following paragraph appeared in the *British North Borneo Herald* for August 1, 1896:—

"Kapok, the down which envelops the seeds of the silk-cotton tree, is, says the *Produce World*, receiving much attention. The cultivation of the trees is even said to be ousting coffee in the province of Burmah; they grow to a height of 80 feet to 100 feet, the wood is soft and worthless; the fibre, kapok, is extensively used for stuffing mattresses, pillows, cushions, seats of railway carriages, &c. The lack of proper machinery for cleaning the fibre stood in the way of its development, but that obstacle has been removed, and the stuff as it comes to market is in excellent condition for the purposes we have named."

Kapok has not been received in this country on a very large scale. It is not, however, quite unknown here. The following particulars have been received from a well-known firm in the City:—

Messrs. Ide & Christie to Royal Gardens, Kew.

72, Mark Lane, London, E.C.,
September 28, 1896.

Sir,

In reply to your letter of the 24th instant, Kapok is coming here regularly to the extent of 100 bales a month from India and Ceylon. To-day's value is 2½*d.* to 4*d.* per lb. The trade is not large, but may grow.

Yours, &c.
(Signed) Ide & Christie.

Dr. Morris, C.M.G.,
Assistant Director, Royal Gardens,
Kew.

DXXXVI.—THE FLORA OF TIBET.

Until quite recently the Herbarium contained no plants from Central Tibet, except a small set of such portions of Przewalski and Potanin's collections as had been worked out by the late Mr. Maximowicz. In 1892, Surgeon-Captain W. G. Thorold presented the plants he collected on his journey across Tibet with Captain Bower; and in 1893 Mr. W. Woodville Rockhill presented, through Professor C. S. Sargent, a similar collection made by himself on his last journey in Tibet. Messrs. Thorold and Bower traversed the country from west to east, between the 30th and 34th parallels of latitude; and Mr. Rockhill's extreme western point was about 90° E. long., a little to the north of Tengri Nor. Some account of these collections will be found in the *Bulletin* for 1893, p. 369, and 1894, p. 136; and they formed the subject of a paper by Mr. W. Botting Hemsley, published in the *Journal of the Linnean Society*, vol. xxx., pp. 101–140. Mr. Rockhill reproduced the account of his plants in his book entitled *Diary of a Journey through Mongolia and Tibet*, pp. 380–385. Full particulars of the localities and altitudes are given; the whole forming an instructive and valuable contribution to botanical literature.

On returning early in the present year, from their arduous journey across Tibet from north to south, Mr. and Mrs. St. George R. Littledale presented Kew with a small collection of dried plants which they had succeeded in saving from the fate of being left by the roadside, a fate which befell the bulk of their collections and instruments. This collection was made in the Goring Valley, in 30° 12′ N. lat., and 90° 25′

E. long., at an elevation of about 16,500 ft. It contains sixty-eight species, including one fern and two funguses, belonging to forty-seven genera and twenty-five natural orders; proportions similar to those of typical insular floras. Ten of the species have been described as new, and, as may be gathered from the enumeration, most of the others belong to the region, or extend only to the Himalayas and the lofty mountains of Western China. A few, such as *Aconitum Napellus*, *Lychnis apetala*, *Potentilla fruticosa*, *Myriophyllum verticillatum*, *Leontopodium alpinum*, *Taraxacum palustre*, *Polygonum viviparum* and *Carex ustulata*, have a wide range. A few others extend to Siberia. Coming to the genera, there is complete evidence that the flora belongs to the cold temperate, and arctic type, which is essentially the same all round the hemisphere. Thirty-four of the genera are British, and most of the others have a wide range. The regional and local genera are; *Meconopsis*, *Dilophia*, *Pleurospermum*, *Cremanthodium* (better treated as a section of *Senecio*), *Oreosolen*, *Rheum* and *Littledalea*; the last a very pretty and distinct new genus of grasses. *Oreosolen* is a singular genus of the Scrophularineæ, of which one species, a native of the northern Sikkim Himalaya, was previously only imperfectly known.

Some further remarks on this collection, by the Director, are reproduced in the current volume of the *Bulletin*, pp. 99–100.

Ranunculaceæ.

Anemone imbricata, *Maxim. Fl. Tangut.* p. 8. t. 22.

A diminutive species restricted to Tibet, and previously collected by Przewalsky and Rockhill only.

Delphinium brunonianum, *Royle, Illustr. Bot. Himal.* p. 56, Hook. f. Fl. Brit. Ind. i., p. 27; Bot. Mag. t. 5461.

This handsome species is common in the Ladak and Karakoram regions.

Delphinium Pylzowi, *Maxim.* in *Bull. Acad. Pétersb.* xxiii. (1877), p. 307; Regel's Gartenfl. 1876, p. 289, t. 879.

Amdo, in western Kansuh, Przewalsky, and Eastern Tibet, Rockhill.

Aconitum Napellus, *L.* var.; Hook. f. Fl. Brit. Ind. i. p. 28.

This very variable plant is spread all round the northern hemisphere. We have not exactly matched Mr. Littledale's specimen, which is remarkable in having a very leafy inflorescence.

Papaveraceæ.

Meconopsis horridula, *Hook. f. & Thoms. Fl. Ind.* 1, p. 252; Hook. f. Fl. Brit. Ind. 1, p. 118.

Sikkim Himalaya and collected in Tibet, both by Thorold and Rockhill.

Meconopsis integrifolia, *Franch.* in *Bull. Soc. Bot. France*, xxxviii. (1886), p. 389; Cathcartia integrifolia, Maxim. Mél. Biol. ix. p. 713.

This exceedingly showy plant was previously known from western Yunnan and Szechuen, and north-western Kansuh or Tangut.

Fumariaceæ.

Corydalis Boweri, *Hemsl.* in *Journ. Linn. Soc.* xxx., p. 108 (1895) Hook. Ic. Pl. t. 2468.

Described from a specimen collected in Tibet by Surgeon-Captain Thorold. It is very closely allied to, if not identical with, *C. mucronifera*, Maxim. Fl. Tangut. i., p. 51. t. 24, fig. 19–21.

Corydalis moorcroftiana, *Wall. Cat.* n. 1432, Hook. f. Fl. Brit. Ind. 1, p. 125.
Afghanistan, North-west India, and West Tibet.

Cruciferæ.

Draba fladnitzensis, *Wulf.*; Hook. f. Fl. Brit. Ind. i. p. 143.
Widely dispersed in northern alpine and arctic regions.

Capsella Thomsoni, *Hook. f.* in *Journ. Linn. Soc.* v., p. 172 (1861); Hook. f. Fl. Brit. Ind. 1, p. 159.
Karakoram, Ladak, and Tibet, at 17,500 ft., collected by Rockhill.

Dilophia salsa, *T. Thoms.* in *Hook. Kew Journ.* Bot. v., p. 20 (1853); Hock. f. Fl. Brit. Ind. i. p. 161.
Ladak, Tian-Schan mountains, and Amdo, Kansuh.

Caryophyllaceæ.

Lychnis apetala, *Linn. Sp. Pl.* p. 437; Hook. f. Fl. Brit. Ind. i., p. 222.
Alpine Himalaya, mountains of North Europe, Asia, and America, and arctic regions; but not reaching the European Alps.

Stellaria decumbens, *Edgew.* in *Trans. Linn. Soc.* xx., p. 35 (1846); Hook. f. Fl. Brit. Ind. i. p. 234, and var. **pulvinata**, Edgew. et Hook. f. loc. cit. p. 235.
Alpine Himalaya, ascending to 18,000 ft. in Sikkim.

Stellaria subumbellata, *Edgew.* in *Hook. f. Fl. Brit. Ind.* i., p. 233.
Sikkim, Ladak, Nubra, and Karakoram, at 11,000 to 16,000 ft.

Arenaria musciformis, *Wall. Cat.* n. 6401; Hook. f. Fl. Brit. Ind. i., p. 237.
Alpine Himalaya, Karakoram, and Tibet at 15,000 to 18,000 ft.

Arenaria (§ Alsine) Littledalei, *Hemsl.*; annua? pusilla, glabra, dense ramosa, purpurascens, ramulis gracillimis, foliis carnosis semiteretibus brevibus vix acutis basi membranaceis vel scariosis cupulatim connatis, floribus minutis axillaribus vel pseudoterminalibus pedicellatis, pedicellis fructiferis accrescentibus, sepalis 4 carnosis in margine scariosis anguste lanceolatis vix acutis erectis supra capsulam conniventibus, petalis nullis, staminibus perfectis sæpius (an semper?) 2, capsula fere a basi 4-valvis, seminibus circiter 8 longe funiculatis lævibus.

Planta sesquipollicaris. *Folia* maxima 4 lin. longa. *Pedicelli* fructiferi usque ad 8 lin. longi. *Sepala* circiter 1 lin. longa capsulam excedentia. *Semina* $\frac{2}{10}$ lin. diametro.

Geraniaceæ.

Geranium collinum, *Steph.*; *Willd. Sp. Pl.* iii., p. 705; DC. Prodr. 1, p. 642; Hook. f. Fl. Brit. Ind. 1, p. 429.
Central and Southern Russia in Europe, Afghanistan, Himalayas, Central Asia, and Siberia.

LEGUMINOSÆ.

Thermopsis lanceolata, *R. Br.* in *Ait. Hort. Kew.* ed. 2, iii. p. 3; Ledeb. Fl. Ross. i., p. 510; Hemsl. in Journ. Linn. Soc. xxxiii., p. 150.
Central Asia and Siberia to North China.

Astragalus strictus, *Grah.*; Hook. f. Fl. Brit. Ind. ii., p. 124.
Widely spread in the Himalayan alpine region and Tibet.

Astragalus (*species indeterminata*). This has not been matched at Kew, but so many species have been described that are not represented in the Herbarium, that it is left undescribed.

Oxytropis cashmerica, *Camb.* in *Jaquem. Voy., Bot.* p. 38, t. 44; Hook. f., Fl. Brit. Ind. ii., p. 139.
Western Tibet and Kashmir.

ROSACEÆ.

Potentilla fruticosa, *Linn. Sp. Pl.*, p. 495; Hook. f. Fl. Brit. Ind. ii., p. 347.
From the Pyrenees and Great Britain eastward, through Central Asia and the mountains of northern India to China and Japan.

Potentilla fruticosa, *Linn.* **var. pumila**, *Hook. f. Fl. Brit. Ind.* ii., p. 348. Potentilla Lindenbergii, *Lehm.* in *Otto Hamb. Gartenz.* vii. p. 339; Revis. Potent. t. 2.
This very marked form or variety is only known from great elevations in the Himalayas and Tibet.

Potentilla bifurca, *Linn. Sp. Pl.*, p. 497; Hook. f. Fl. Brit. Ind. ii., p. 353.
Caucasus and Taurus, in high alpine regions, eastward in the Himalayas and Central Asia to Mongolia.

SAXIFRAGACEÆ.

Saxifraga tangutica, *Engl.* in *Bull. Acad. St. Pétersb.* xxix., p. 114 (1883).
A very distinct species of which Kew previously possessed specimens collected by Przewalski in the mountains on either side of the Tetung river, a little to the north of Koko Nor.

CRASSULACEÆ.

Sedum tibeticum, *Hook. f. & Thoms.* in *Journ. Linn. Soc.* ii., p. 96; Hook. f. Fl. Brit. Ind. ii., p. 418.
North-west Himalaya and western Tibet.

Sedum (§ Rhodiola) rotundatum, *Hemsl.*; glabrum rhizomate crassissimo colorato multicauli, caulibus subcarnosis erectis simplicibus, internodiis quam folia brevioribus, foliis sessilibus carnosis oblongo-rotundatis vel interdum vere orbicularibus integris vel interdum obscurissime lobulatis, cymis parvis paucifloris, floribus (masculinis tantum visis) rubris parvis, sepalis carnosis brevibus ovato-oblongis obtusissimis, petalis linearibus obtusis, filamentis filiformis, carpellis fatuis validis.—*Hook. Ic. Pl.* t. 2469.
Rhizoma 1 poll. crassum. *Caules* circiter 6 poll. alti. *Folia* ½–1 poll. diametro. *Cymæ* fl. masc. vix 6 lin. diametro. *Sepala* 1 lin. longa. *Petala* 2–2½ lin. longa.

Sedum Przewalskii, *Maxim.* in *Bull. Acad. St. Pétersb.* xxix., p. 156.
Previously only known from the same region as *Saxifraga tangutica*, Engl.

Sedum quadrifidum, *Pall.*?
The species of this affinity are difficult to identify from dried specimens, and a satisfactory determination would involve the examination of a large number of specimens.

Haloragæ.

Myriophyllum verticillatum, *Linn. Sp. Pl.*, p. 992; Hook. f. Fl. Brit. Ind. ii., p. 433.
Widely spread in the northern hemisphere, including America.

Umbelliferæ.

Pleurospermum Hookeri, *C. B. Clarke*, var. **Thomsoni**, Hook. f. Fl. Brit. Ind. ii., p. 705.
Western Tibet.

Pleurospermum?
Probably new, but the specimens bear only very young inflorescences.

Caprifoliaceæ.

Lonicera hispida, *Pall.*; Hook. f. Fl. Brit. Ind. iii., p. 11; Lonicera bracteata, Royle Illustr. t. 53.
Himalayas, from Kashmir to Sikkim, Central Asia and Siberia.

Compositæ.

Aster tricephalus, *C. B. Clarke*, *Comp. Ind.* p. 43; Hook. f. Fl. Brit. Ind. iii., p. 250.
Previously only known from Sikkim, Himalaya at 13–15,000 ft.

Aster tibeticus, *Hook. f. Fl. Brit. Ind.* iii., p. 251.
Western Himalaya, Karakoram and Tibet.

Aster Bowerii, *Hemsl.* in *Journ. Linn. Soc.* xxx., p. 113.
Described from small specimens collected by Dr. Thorold. Mr. Littledale's specimen is much more vigorous, and bears ripe achenes, from which a figure has been prepared for *Hooker's Icones Plantarum*, t. 2495.

Leontopodium alpinum, *Cass.*, varietates; Hook. f. Fl. Brit. Ind. iii., p. 279.
Besides the ordinary form, which is abundant in the Himalayas and extends to China and Mandshuria, there is an elegant dwarf variety with spathulate leaves. In the Himalayas this plant exhibits a great range of variation from a moss-like condition, less than an inch high, up to a foot or more.

Artemisia Stracheyi, *Hook. f. & Thoms. ex C. B. Clarke*, *Comp. Ind.* p. 164; Hook. f. Fl. Brit. Ind. iii., p. 328.
Western Tibet, 15,000 to 17,000 ft.

Artemisia salsoloides, *Willd. Sp. Pl.* iii., p. 1832; Hook. f. Fl. Brit. Ind. iii., p. 321.

Caucasus, Siberia, Mongolia, North-western India and the adjoining part of Tibet.

Anaphalis xylorhiza, *Sch. Bip. ex Hook. f. Fl. Brit. Ind.* iii., p. 281.

Sikkim Himalaya, in the Tibetan region, and Kumaon. It was also collected by Thorold at an elevation of 15,500 ft.

Tanacetum tibeticum, *Hook. f. & Thoms. ex C. B. Clarke, Comp. Ind.* p. 154; Hook. f. Fl. Brit. Ind. iii., p. 319.

Western Tibet, Parang and Lanak passes. Also collected by Thorold in Central Tibet.

Senecio (§ Cremanthodium) goringensis, *Hemsl.*; perennis, nanus, albo-puberulus, caulibus 1–2-foliatis 1–2-cephalis, foliis crassiusculis subcoriaceis radicalibus longe petiolatis ovali-oblongis inconspicue calloso-denticulatis apice obtusis vel rotundatis basi in petiolum attenuatis costa crassiuscula venis immersis obsoletis, capitulis radiatis cernuis, bracteis involucri circiter 20 molliter pubescentibus fere ad medium connatis vix acutis, floribus radii circiter 20 luteis angustis bracteas fere dimidio excedentibus, floribus disci numerosis, achæniis glabris oblongis ut videtur compressis sed maturis pappo albo sericeo corollas tubulosas paullo excedente.

Planta 4–9 poll. alta. *Folia* absque petiolis 1¼–2 poll. longa, et ½–1 poll. lata; petiolis 2–3 poll. longis. *Capitula* circiter 1½ poll. lata. *Flores* radii cum achæniis circiter 9 lin. longi.

Senecio (§ Cremanthodium) Fletcheri, *Hemsl.*; perennis, nanus, capitulis exceptis glaber, caulibus 1–2-foliatis 1–2-cephalis, foliis crassis coriaceis vel subcarnosis oblongo-lanceolatis obtusiusculis basi inter se vaginantibus calloso-dentatis costa deorsum incrassata atropurpurea venis immersis obsoletis, capitulis radiatis cernuis, involucri bracteis herbaceis circiter 12 basi connatis anguste oblongo-lanceolatis vix acutis setuloso-hirsutis nigrescentibus, floribus radii 12–15 luteis oblongo-lanceolatis bracteas dimidio excedentibus, floribus disci numerosis ut videtur apice nigrescentibus vel purpurascentibus, achæniis glabris oblongis ut videtur compressis sed maturis non visis, pappo albo laxo fere plumoso sericeo corollas tubulosas paullo excendente.

Planta circiter 6 poll. alta. *Folia* radicalia 3–4 poll. longa et 8–10 lin. lata, caulina minora. *Capitula* 1½–2 poll. diametro. *Flores radii* cum achænio pollicares. *Flores disci* circiter semipollicares.

Named after Mr. W. Fletcher, who accompanied Mr. and Mrs. Littledale and took part in the work of the expedition.

Saussurea Thoroldi, *Hemsl. in Journ. Linn. Soc.* xxx., p. 115, t. 5 (1895).

Previously collected by Dr. Thorold, and specimens have recently been received at Kew, from St. Petersburg, collected in Zaidam by Przewalski, and in Szechuen by Martin.

Saussurea subulata, *C. B. Clarke, Comp. Ind.* p. 226; Hook. f. Fl. Brit. Ind. iii. p. 367.

Nubra and Yarkand, at 15,000 to 18,000 ft., and in Tibet by Dr. Thorold at 17,000 ft.

Taraxacum palustre, *DC. Fl. Fr.* iv., p. 45; DC. Prodr. vii., . 148; Hemsl. in Journ. Linn. Soc. xxx., p. 137.

Taraxacum officinale, var. parvula, *Hook. f. Fl. Brit. Ind.* iii, p. 401.

Throughout the Himalayas at 10,000 to 18,000; and all over Europe in montane, alpine and arctic regions.

Primulaceæ.

Primula rotundifolia, *Wall. ex Roxb. Fl. Ind. ed. Carey*, ii., p. 18; Hook. f. Fl. Brit. Ind. iii., p. 483.

Himalayas from Kashmir to Sikkim.

Primula purpurea, *Royle, Illustr.* p. 311, t. 77, f. 2; Hook. f. Fl. Brit. Ind. iii., p. 490, *sub P. Stuartii.*

Upper Sikkim to the north-west Himalaya and contiguous countries.

Boraginaceæ.

Echinospermum sp.

Specimen too young and meagre for satisfactory determination.

Scrophularineæ.

Pedicularis rhinanthoides, *Schrenk in Fisch. & Mey. Enum.* p. 22; Hook. f. Fl. Brit. Ind. iv., p. 314; Prain in Ann. Bot. Gard. Calc. iii., p. 109, t. 1.

Himalaya Mountains, Western China, Turkestan, Tibet.

Pedicularis Przewalskii, *Maxim.* in *Bull. Acad. St. Pétersb.* xxiv., p. 55 (1878); Mél. Biol. x., p. 84, et xii., p. 787, t. 1, f. 2; Prain in Ann. Bot. Gard. Calc. iii., p. 120, t. 5.

Tibet, Szechuen, and Western Kansuh.

Oreosolen unguiculatus, *Hemsl.*; species habitu foliisque *O. Wattii* simillima, sed corolla valde inæqualiter bilabiata sat diversa; glabrescens, subacaulis, foliis subrosulatis crassis subcarnosis ovato-rotundatis vel fere orbicularibus inferne subito constrictis subpetiolatis grosse crenato-dentatis a basi 5–7-nervis, nervis venisque crassis laxe reticulatis subtus præsertim conspicuis, floribus paucis in axillis foliorum subsessilibus, calycis segmentis brevibus fere liberis lineari-oblongis subacutis, corollæ tubo gracillimo vere cylindrico labio superiore unguiculato bifido labio inferiore æqualiter trilobato lobis angustis oblongis obtusis, staminibus 4 vix exsertis, staminodio brevi subulato labio superiore prope sinum enato, ovario glabro stylo filiformi stamina superante.—*Hook Ic. Pl.* t. 2467.

Folia maxima 2 poll. diametro. *Flores* circiter pollicares. *Corollæ* abium superius inferiorem fere duplo superans.

Labiatæ.

Nepeta decolorans, *Hemsl.*; fere omnino sericeo-hirsuta, albida, caulibus brevissimis adscendentibus, internodiis 2–3 inferioribus folia excedentibus, foliis radicalibus non visis, caulinis crassis mollibus rugosis venis crassis conspicuis brevissime petiolatis vel sessilibus interdum fere orbicularibus grosse crenatis basi nunc subcuneatis nunc subcordatis inferioribus minoribus distantibus superioribus floralibus majoribus confertissimis, pedunculis subtrifloris pedicellisque brevissimis, bracteolis setiformibus, calyce intus extusque villoso insigniter bilabiato, labio superiore dimidio longiore brevissime tridentato, inferiore bifido

dentibus omnibus acutis, corollæ labio superiore bilobato lobis rotundatis, labii inferioris lobis lateralibus dentiformibus, staminibus 2 posterioribus longioribus labium æquantibus, 2 anterioribus vix e tubo exsertis, nuculis glabris oblongis.—*Hook. Ic. Pl.* t. 2470.

Caules 2–3 poll. longi. *Folia* caulina inferiora 3–4 lin. diametro, maxima 1 poll. diametro. *Calyx* circiter 4 lin. longus. *Corolla* 8–9 lin. longa.

Phlomis rotata, *Benth. ex Hook. f. Fl. Brit. Ind.* iv., p. 694.

The inner ranges of Sikkim Himalaya at 13,600 ft., collected by Sir Joseph Hooker, and recently by Dungboo, one of Dr. King's native collectors. A singular plant almost exactly like *Orcosolen unguiculatus* in habit and foliage.

Polygonaceæ.

Polygonum sphærostachyum, *Meissn. Monog.* p. 53; Hook. f. Fl. Brit. Ind., v., p. 32; Bot. Mag. t. 6847.

Western Tibet and Gilgit to Sikkim at 11,000 to 15,000 ft.

Polygonum viviparum, *Linn. Sp. Pl.* p. 360; Hook. f. Fl. Brit. Ind., v., p. 31.

Widely spread in alpine and arctic regions in Europe, Asia, and America.

Polygonum (§ Aconogon) tibeticum, *Hemsl.;* perenne, nanum, undique glabrum, caulibus erectis gracilibus lignescentibus pauciramosis, internodiis quam folia brevioribus, stipulis amplis tenuissimis truncatis vel obliquis cito ad basin fissis, foliis brevissime petiolatis crassis vix coriaceis obovato-oblongis marginibus (in siccis) recurvis venis immersis inconspicuis, cymis parvis densis terminalibus brevissime pedunculatis pedicellis brevissimis, perianthii segmentis 5 valde inæqualibus obovato-spathulatis apice rotundatis stamina superantibus, staminibus 8 inæquilongis hypogynis, disco inter stamina et ovarium carnoso 8-lobato lobis ovoideis, ovario glabro, stylis brevissimis stigmatibus magnis capitatis, nuce ignota.—*Hook. Ic. Pl.* t. 2471.

Caules 8–12 poll. alti. *Folia* cum petiolo 1–1½ poll. longa. *Cymæ* (2 tantum visæ) 6–9 lin. diametro. *Flores* circiter 2½ lin. diametro.

Rheum spiciforme, *Royle Illustr.*, p. 318, t. 78; Hook. f. Fl. Brit. Ind., v., p. 55.

Afghanistan, North-west Himalaya, and adjoining countries.

Mr. Littledale's specimen consists of a young plant having quite small leaves, and no inflorescence; but there is a similar specimen in the Herbarium, from North Tibet, collected by Przewalski, and referred to this species by Maximowicz.

Urticaceæ.

Urtica hyperborea, *Jucq. ex Wedd. in Arch. Mus. Par.* ix., p. 68 (1856); Hook. f. Fl. Brit. Ind. v., p. 548.

Eastern and southern Tibet, at 12,000 to 17,500 ft.

Salicaceæ.

Salix Lapponum, *Linn. Sp. Pl.*, p. 1019; Ledeb. Fl. Ross. iii., p. 617.

Widely spread in cold, temperate, and arctic regions of Europe, Asia, and America.

Cyperaceæ.

Scirpus Caricis, *Retz. Fl. Scand. Prod.*, p. 11; Hook. f. Fl. Brit. Ind. vi., p. 660.

Europe, West and Central Asia, and the mountains of North India.

Kobresia sp.

Mr. C. B. Clarke, who kindly examined this and the other Cyperaceæ in the collection, did not succeed in matching this in the Kew Herbarium, but the material is hardly sufficient for description.

Carex ustulata, *Wahl. in Vet. Akad. Nya. Handl. Stockh.*, p. 156 (1803); Hook. f. Fl. Brit. Ind. vi., p. 734.

Widely spread in the cold regions of the northern hemisphere, and ranging between 12,000 and 17,000 ft. in the mountains of North India.

Gramineæ.

Littledalea, *Hemsl.*; Spiculæ variabiles, 2–8 floræ, laxe paniculatæ, graciliter pedicellatæ, rachilla inter flores elongata, glabra, juxta flores et supra glumas inferiores articulata; flores grandes, hermaphroditi vel supremo imperfecto. Glumæ 2 inferiores vacuæ, inæquales, quam florentes multo minores, ecarinatæ, obtusæ vel truncatæ, simul emarginatæ vel erosæ, muticæ, trinervatæ, nervis haud excurrentibus lateralibus medium non attingentibus; florentes amplæ, truncatæ vel rotundatæ, supra medium hyalinæ, muticæ, ecarinatæ, demum erosæ, basi insigniter callosæ, 7-nervatæ, nervis omnibus vix excurrentibus; palea multo minor, bifida, bicarinata. Stamina 3. Lodiculæ 2, tenues, angustæ, oblongæ, integræ. Styli brevissimi, stigmatibus late plumosis. Caryopsis immatura hirsuta.—Gramen ut videtur perenne, pulchrum, erectum, foliis planis brevibus. Panicula terminalis, angusta, ramulis sæpissime geminatis pedicellisque capillaribus. Spiculæ sæpe geminatæ, altera minore pedicello breviore.

L. tibetica, *Hemsl.*; culmis simplicibus graciliusculis glabris lævibus sæpissime (an semper?) bifoliatis (nodo unico tantum perspicuo) internodio superiore longissime exserto, vaginis laxis glabris vel inferioribus puberulis superioribus apertis, laminis brevibus linearibus subacutis valide striatis utrinque puberulis basi appendice setuliformi utrinque instructis, ligula folii caulini inferioris magna integra vel demum lacerata foliorum superiorum adnodum redacta, paniculæ ramulis sæpius floribus 4, floribus puberulis purpureis.—*Hook. Ic. Pl.* t. 2472.

Culmi 1½–2 ped. alti. *Lamina* foliorum caulinorum 2–3 poll. longa, radicalium longior sed culmis multo brevior. *Ligula* bene evoluta 2 lin. longa. *Panicula* 4–5 poll. longa, ramulis ½–2 poll. longis. *Spiculæ* maximæ pollicares. *Gluma exterior* circiter 3-lin. longa, secunda 4½ lin. longa. *Gluma florens* 6–7 lin. longa, aperta, 2 lin. lata. *Palea* circiter 4 lin. longa.

Agropyrum striatum, *Nees ex Steud. Syn. Pl. Gram.*, p. 346. Throughout the Himalayas at considerable altitudes.

Filices.

Polypodium hastatum, *Thunb.*; *Hook. Sp., Fil. v., p.* 74.

Japan, Formosa, Corea, and nearly throughout China. It was also collected by Père David in Moupine, Eastern Tibet; but Mr. Littledale's locality is the most western yet known.

AGARICINEÆ.

Lentinus curtipes, *Massee;* pileo infundibuliformi coriaceo-lento pallide luteo centro saturatius colorato e centro radiatim squamuloso-maculato margine integro involuto, stipite solido duro curto pallido hic inde tomento pruinoso flavido obtecto, lamellis decurrentibus angustis distantibus albo-luteis acie minutissime crenulato, sporis lævibus hyalinis subsphæroideis 1–2-guttulatis 5–6μ diam.

Pileus 1¼ poll. diam. *Stipes* 4–5 lin. longus et 2–3 lin. crassus.

Allied to *L. Thwaitesii*, B. & Br., Ceylon, but differing in the scaly pileus, broader gills, and subglobose spores.

Agaricus (Naucoria) pediades, *Fries Epicr.*, p. 197.
Europe, Central Asia, North America, tropical and South Africa, Ceylon, South Australia, and New Zealand.

DXXXVII.—CEDAR TREE OF MOUNT MLANJE.

(*Widdringtonia Whytei*, Rendle.)

A note on the recently discovered native cedar tree of British Central Africa was published in the *Kew Bulletin* (1895, p. 189). The timber is described as "equal to the finest pine and easily worked." It is gratifying to find that this valuable and interesting tree is likely to be carefully preserved in its present localities and also planted in the neighbourhood of the coffee estates in the Shiré Highlands.

The following further information respecting it has been communicated by the Secretary of State for Foreign Affairs:—

THE FOREIGN OFFICE to ROYAL GARDENS, KEW.

SIR, Foreign Office, March 25, 1896.

I AM directed by the Secretary of State for Foreign Affairs to transmit to you, to be laid before the Director, the accompanying copy of a despatch containing a report on the cedar forests at Mlanje in British Central Africa.

I am, &c.

The Assistant Director, H. PERCY ANDERSON.
Royal Gardens, Kew.

[Enclosure.]

Commissioner Johnston to the Marquess of Salisbury.

(No. 151. Central Africa.) The Residency, Zomba,
MY LORD, 31st December, 1895.

THE following extract from a Report by Mr. John McClounie, the Forester in the service of the British Central Africa Administration in charge of the Mlanje cedar forests, may be of interest to your Lordship.

Mr. McClounie writes:—

I have now been all over the Ruo Plateau, and the Luchenya, the Likubula Gorge, and the Tuchila Plateaux. The district round the source of the Tuchila is by far the best and most timbered part of the mountain. A few straggling trees are seen near the sources of the Ruo, and only one of any size, while the Luchenya is dotted with cedar along

its slopes. The Likubula is well wooded, but the forests are almost inaccessible. On the plateau round the source of the Tuchila the ground is covered with compact cedar forests, and may be estimated at 700 to 800 acres; on that around the Likubula about 200 acres, and a further 100 acres round about the Luchenya. Giving the number of trees to the acre as 150, the total number of full-grown existing cedar trees would stand at about 150,000, with an average of 40 cubic feet of timber each. At the present value of 3*s*. per cubic foot the total value of these trees would be 900,000*l*.; but if this timber was sold as it ought to be at 6*s*. a cubic foot the wealth would be doubled. As I have gone all over the woods and noticed quantity and quality, these figures may be taken as near the mark. It is abundantly in evidence that the whole of the plateau was at one time covered with cedar, as in recent diggings cedar roots were met with where there was no trace of them on the surface. Without doubt, fire has been the destructive agent, and it can easily be imagined as the under-growth gets tall and thick that at the dry season a gust of wind would fan a flame into an immense conflagration, and this cedar wood being exceedingly full of ignitible resins, a large tract of forest would soon disappear. Consequently, there ensues a decrease in rainfall, and then come further fires to complete the destruction; which destruction has been so nearly total that this valuable tree is now only to be met with on the upper plateau of Mlanje in damp places, and along the streams. It is no exaggeration to say that five or six years more delay in the assumption of control over the remaining patches of cedar forest would have meant the entire extinction of this unique conifer which there is abundant evidence to show once inhabited all the high mountains and plateaux in the southern part of British Central Africa.

Up to the present I have cut up nothing but dead wood, which, in most cases, is in good seasonable condition. The supply of timber yearly might be considerable, and not materially affect the forests for many years, especially as there are large numbers of young trees growing up in all the woods which must now be protected from fire.

I have this season sown a large quantity of cedar-seed which should be ready in a year to transplant, the ground to be planted must be thoroughly hoed and cleaned to remove grass, &c., and prevent fires.

Possibly this extract from Mr. McClounie's Report may be of interest to the authorities at Kew. I do not forward the whole of the Report as it deals with other matters, and will be eventually merged in the annual Report from this office.

I have, &c.
(Signed) H. H. Johnston.

DXXXVIII.—MISCELLANEOUS NOTES.

Mr. Thomas James Harris, a member of the gardening staff at Kew has been appointed by the Secretary of State for the Colonies Superintendent of the King's House Gardens and Grounds, Jamaica. He left for the West Indies on October 7th last.

Mr. Eugene Campbell, trained at the Botanical Gardens, Jamaica, and latterly Superintendent of King's House Gardens and Grounds

in that island, has been appointed Curator of the Botanic Station at Belize, British Honduras. He was to leave Jamaica for Belize at the beginning of October.

Mr. James E. Hartley, a foreman at the Hope Botanical Gardens, Jamaica, has been appointed Overseer of the Botanic Station at Sierra Leone. He will be engaged, under the Curator, Mr. Willey, in the experimental cultivation of coffee and cacao and in training native boys in horticultural work. Mr. Hartley spent a short time at Kew on his way to West Africa.

News of the unexpected death on October 9th of the eminent Australian botanist, Sir Ferdinand von Mueller, reached London on October 10th. In this place some record should be given of his connection with Kew and his services to the establishment during a period of nearly 50 years.

F. Mueller was born at Rostock in 1825, educated at Kiel, and began his botanical career by devoting several years to the investigation of the Flora of Schleswig-Holstein. In consequence of symptoms of phthisis, he emigrated to Australia in 1847, and at once commenced the study of the native flora; a study he must have continued almost to the day of his death, for Kew received some seeds from him the very day of the announcement. But it may, perhaps, be regarded as a significant fact that no written communication accompanied the packet, though it was addressed in his own hand. A later mail (October 19) has brought further news from him, but no reference to indisposition.

In the official correspondence of the period of Sir William Hooker's Directorship of Kew, the first communication from Mueller is dated February, 1853, and was written in pencil at his first camp, on his first journey to the Australian Alps. It announces his appointment, by the "scientific" Lieutenant Governor La Trobe, as Government Botanist; a post he held until his death. At this early date he spoke of a project he had conceived of writing a Flora of the whole of Australia, estimating the number of species at 10,000. He also proposed an interchange of ideas, an exchange of plants and seeds, and requested assistance in the revision and publication of his manuscripts relating to the flora of the continent. The correspondence thus begun has been continued with unflagging vigour with Kew, and, it may be added, with great advantage to both sides. During the same year (1853) two of his papers, which had previously been read before the Linnean Society, were published in *Hooker's Kew Journal of Botany*. These were succeeded by an unceasing outpour of papers, published in numerous European and Colonial periodicals, and by many important independent works, to specify which would fill pages of the *Bulletin*. From the very beginning of his career and onward he most liberally supplied Kew with sets of plants collected by himself on his various journeys, amounting to some 25,000 miles, and by others, at his instigation and often partly at his expense. His two first consignments, received in the fifties, exceeded 2000 species. The most extended journey he made was as botanist to the Gregory Expedition, across North Australia; and his narrative of this journey in *Hooker's Kew Journal of Botany*, vols. viii. and ix., is one of his most interesting contributions to our knowledge of the vegetation of Australia, from actual observation. In one of these communications he says: "You receive always the whole of the specimens of every

rare kind . . . . the plants being so much more useful at Kew than in Australia." He also expressed a strong desire to be able to return to Europe and work out his extensive collections at Kew, as he was fully aware that it was impossible to do it satisfactorily in Australia. This desire was never realised, and when, in 1861, the Australian Colonies, mainly through his exertions, agreed to grant funds for the publication of a general Flora of the country, he generously acceded to the view held by many botanists, that for so important an undertaking the labour should be secured of the most experienced and skilful of British descriptive Botanists, Mr. G. Bentham, with the admirable result known to all. He not only relinquished a work he had set his heart upon, but cordially assisted Mr. Bentham and transmitted the whole of his vast herbarium to Kew for the purpose. In the meantime he had published in his *Fragmenta* and elsewhere a large number of the novelties in his collections. Seldom a mail arrived without bringing some contribution from him to the herbarium, museum or garden. In 1857 Mueller was appointed Director of the Melbourne Botanic Garden, a post which he held until 1873, when he was superseded in consequence of not meeting popular demands as to the decoration of the garden. This was a source of great grief to him; yet there is no doubt there was some justification for the step, because in spite of his immense enthusiasm he was a somewhat unpractical man. He could plan better than he could carry into effect, as is exemplified by the fact that nobody did more to aid and encourage agricultural and horticultural industries by his pen and his extensive connection among the botanists and horticulturists of all countries.

Australia loses in him one of her most eminent scientific men, one of her greatest benefactors, and one of those men who effect incalculable good in a young country. Kew has lost a most valued correspondent and constant supporter. His services were, however, not confined to Australia and Kew. India, France, Italy, Algeria, and North America are under great obligations to him for the introduction of Australian trees, especially Eucalypti and Myrtaceae, now assuming forest proportions; and the gardens of the Riviera are largely indebted to him for flowering shrubs from the Antipodes that attract the attention of many visitors to that winter resort of all Northern Europe.

A note was published in the *Kew Bulletin* (see *ante*, p. 147) announcing the retirement, on account of ill-health, of Dr. Trimen, F.R.S., Director of the Royal Botanic Gardens, Ceylon. Since then news of his death has been received in this country with general regret. He died at Peradeniya on the 16th October in his 53rd year. In his last letter to Kew, dated August 30, he mentioned that he wrote lying on his back, after ten days' bed, having quite lost the use of his legs. Still he wrote cheerfully and hopefully, and, with regard to the *Handbook of the Flora of Ceylon*, his *magnum opus*, he remarked: "I do hope I shall be able to finish it, but there is much hard work to be done yet." It appears that he rallied, and struggled on with his work; but on the 15th ult. a telegram was received by his brother in England that he had had another serious attack, and sixteen hours later his death was reported.

Henry Trimen was born in London in 1843, educated at King's College, and graduated M.B. in the University of London in 1865. He devoted himself entirely to botany, and was Lecturer on Botany at St. Mary's Hospital Medical School from 1867 to 1872. In these early years he was an ardent student of British botany; took an active part

in the Botanical Exchange Club, and published, jointly with Mr. W. T. Thiselton-Dyer, a *Flora of Middlesex* in 1869. He was also the first to discover *Lemna arrhiza* in England. In 1869 he was appointed Senior Assistant in the Botanical Department of the British Museum, a post he held until the end of 1879, when he accepted the Directorship of the Ceylon Botanic Gardens. Between 1875 and 1880 he was associated with Professor R. Bentley in the publication of their well-known *Medicinal Plants;* and he was editor of the *Journal of Botany*, founded by Dr. B. Seemann, from 1872 to 1879, a task he performed with great tact and judgment, besides being a considerable contributor to its pages. Indeed all his work was of a very thorough and finished character, the outcome of patient research, discrimination, and aptitude. It is a pity that his admirable *Handbook of the Flora of Ceylon* (see *Kew Bulletin*, 1894, pp. 34 and 227, and 1895, p. 236) is left unfinished. It will be most difficult to find a botanist who could complete it on the same lines. In previous references to his work no mention has been made of the maladies from which Dr. Trimen suffered during the last few years of his life, but there is no longer any reason for reticence. Absolute deafness, and total paralysis of the legs, both of gradual development, and accompanied by other infirmities and derangements, were borne with fortitude and cheerfulness up to the last. This was in accord with his general character and kind, amiable disposition.

Botanical Magazine for October.—The Japanese *Actinidia polygama*, which is the subject of plate 7497, was drawn from a specimen sent to Kew by the Rev. Canon Ellacombe, of Bitton, in whose garden it flowered in June, 1895. *Alocasia reversa*, *Lathyrus undulatus*, *Fritillaria nobilis*, and *Parrotia jacquemontiana* were drawn from plants in the Kew collection. The *Alocasia*, native of the Philippine Islands, has, like other species of the genus, large, ornamental foliage. It was imported by Messrs. Sander, of St. Albans, and a plant was presented by them to Kew. *Lathyrus undulatus* (better known in gardens as *L. Sibthorpii*), from the shores of the Dardanelles, is closely allied to *L. rotundifolius* and *L. latifolius*. The *Fritillaria* is a native of Armenia, and bulbs were presented to Kew by Mr. Max Leichtlin. *Parrotia jacquemontiana* was raised from seeds received from Mr. Robert Ellis, of the Forest Department, Punjab.

Botanical Survey of India.—An interesting Report of the progress of the survey has been issued by Dr. King, C.I.E., F.R.S., the Director. The most important portion relates to the survey of Northern India. The following is Dr. King's summary of the results:—

The report for the year was submitted by Mr. J. F. Duthie. He did not himself undertake any exploratory tour during the year; but useful collecting work was done in Waziristan by means of native collectors. Part of Mr. Duthie's time was occupied in examining and naming various collections sent from Chitral by officers belonging to the field force, one of which in particular, sent by General Gatacre, C.B., contained plants of special interest; and part was occupied in useful herbarium work at Saharunpur; in visiting the Usar Reserves and the public gardens, in Northern India; and in conducting examinations at the Forest School. It was not found possible by Government to permit Mr. Duthie to accompany the Pamir Delimitation Commission, and the work of botanical collection was accordingly delegated to Surgeon-

Captain Alcock, I.M.S., who accompanied the expedition as Surgeon Naturalist. Dr. Alcock brought back a most interesting collection, which is now being worked up by Mr. Duthie. The result will be published, I understand, in a volume on the Natural History of the Pamir Boundary Commission, which it is intended to issue.

Castilloa elastica in Trinidad.—Mr. J. H. Hart, F.L.S., Superintendent of the Botanic Gardens at Trinidad, writes :—" We have raised and sold some 10,000 *Castilloa* this year, and we have a plantation in Tobago, and one here ready for bleeding."

Minor Industries in Bermuda.—In the *Report* for 1895, on the Colony of Bermuda [Colonial Reports, Annual, 1896, No. 166], the following particulars are given respecting its cultural industries :—

The principal exports to the United States were onions, valued at 44,424*l.*, a decrease compared with the preceding year of 990*l.*, and compared with 1893 a decrease of 15,446*l.*, lily bulbs, valued at 28,370*l.*, an increase compared with the preceding year of 11,248*l.*, and potatos, 26,495*l.*, an increase of 7,778*l.*

The decrease in value of the onions exported during 1895 was due to a fall in price in the New York market, the crop having been much larger than that of the preceding year. In the case of potatos the increase may be accounted for by the larger crop raised, and in the case of lily bulbs the increase was due partly to better prices and partly to larger crops.

Director of Agriculture, Zanzibar.—In the *Kew Bulletin* for the current year (pp. 80–86), some account is given of the present state of botanical enterprise on the east coast of Africa. As will be seen from the following communication an important step has now been taken by the Government of Zanzibar in the appointment of a Director of Agriculture :—

DIRECTOR OF AGRICULTURE, ZANZIBAR, to ROYAL GARDENS, KEW.

H. H. The Sultan of Zanzibar's
Government Offices, Zanzibar,
October 1, 1896.

DEAR SIR,

THE Government of Zanzibar have decided to appoint a Director of Agriculture, and have selected me for the post.

Their object in creating the post is to improve, where possible, the methods under which the agriculture of the country is now carried on, and to endeavour by experiment to discover some new product that may to a certain extent take the place of cloves. The Government desire that the work so admirably begun by Sir John Kirk when he was Consul General there, and since interrupted, may be continued.

* * * *

I am, &c.,
R. N. LYNE.

W. T. Thiselton-Dyer, Esq., C.M.G., &c.,
Director, Royal Gardens, Kew.

Mr. Robert Nunez Lyne, obtained a diploma and first class honours in the Canterbury Agricultural College, University of New Zealand; he has held the posts of Lecturer on Agriculture and Botany, Wellingore Hall Agricultural College (near Lincoln), and Lecturer on Agriculture under the Lincolnshire County Council. He is a member of the Royal Agricultural Society of England.

Chinese Liquorice.—In reference to the article in the *Kew Bulletin* (1894, pp. 141–146) Dr. Bretschneider draws attention to the particulars respecting the Chinese drug published by him in his *Botanicon Sinicum* (Part iii., p. 15) :—

Liquorice, places of production :—Chili, Shantung, Shensi, Kansu. Newchwang exported in 1885 to other Chinese ports 1767 piculs, Tientsin exported 4576 piculs, Chefoo exported 8690, Hankow exported 1148.

In 1882 I sent some specimens of Chinese liquorice root from Shansi to Dr. Flückiger, who in the second edition of his *Pharmocognosie* (p. 355) writes that he is not able to distinguish it from Spanish liquorice of the first quality.

The liquorice root used in medicine in Europe is derived from *Glycyrrhiza glabra*, L., indigenous in Southern Europe. The typical form of this supplies the Spanish liquorice, which is considered to be the best. The variety *glandulifera*, which grows in Hungary and South Russia, yields the Russian liquorice; this is also derived from *G. echinata*, L.

Loureiro (*Fl. Cochin.*, 543) states that Chinese liquorice root is yielded by *G. echinata* and *glabra* of the northern provinces of China. (*See* my *Early Europ. Res. Fl. China*, p. 145.)

Bunge (*Enum. Pl. Chinæ Bor.*, 97) records *G. glandulifera* from the neighbourhood of Peking and the Great Wall.

Przevalsky (*Mongolia, Tangut, &c.*, Engl. edition 1, 191) states that the root of *G. uralensis*, Fischer, one of the characteristic plants of the Ordos, is dug up there by the Mongols, hired by the Chinese, who despatch the drug down the Huang-ho to supply the Chinese markets. The same plant is recorded by Father David (Franchet, *Plantæ Davidianæ, Mongol.*, 93) from the Peking Plain and Southern Mongolia. It grows also in the Altai and Ural Mountains.

Dates.—In reference to the notes on Date Cultivation in Australia (*Kew Bulletin*, 1895, pp. 161–2) and Antigua (1895, pp. 26–28) the following brief account of what may be considered the normal growth of the tree will be useful for comparison :—

Extract from the Report for the year 1894–95 on the Trade of the Kerman Consular District, Persian Beluchistan (F.O. 1896, Annual Series, No. 1671, p. 7).

Dates grow to great perfection in many parts of the country, notably at Pahraj and Fanoch. The output could be easily doubled by planting fresh palm groves.

Date palms begin to yield at three years, and reach their prime at 30. A good crop for a single tree would be from 80 to 100 lbs. They are fertilised by hand, one male tree supplying pollen for perhaps 40 female plants. The dates used for export are those that grow at the summit of the tree. From the action of the sun they become hard and dry, thus being easily packed. The lower branches remain soft, and are kept for local consumption.

Tulip-tree Wood for Cigar boxes.—The following note appears in *Garden and Forest*, for January 29th, 1896 (p. 50) :—

"Formerly Cuban and domestic cigar boxes were all made from the wood of the Spanish Cedar, a species of West Indian Cedrela, but now the demand for boxes to hold cheap domestic cigars is so great in this country that other woods, stained to resemble Spanish Cedar, are largely used for the purpose. The wood of the Tulip Poplar, *Liriodendron tulipifera*, is considered the best of the North American woods for this purpose, although chestnut, butternut, elm, basswood, and cottonwood have been tried. Cigar boxes are also now very largely made in the United States with veneers of Spanish Cedar cut in thicknesses of from eighty to one hundred and twenty sheets to one inch, and mounted on cheap American woods like cottonwood or basswood."

A new Brazil wood.—*Cæsalpinia bicolor*, C. H. Wright, is a small leguminous tree 15 to 20 feet high. It has several stems thrown up from the base "none of which are over three inches in diameter." The branches are scantily armed with thorns, the leaves are bipinnate with eight to 12 alternate ovate-emarginate leaflets; flowers red-purple with a flat broad pod, 2 inches long and about an inch wide, containing five seeds. Specimens in the Kew Herbarium are from Chachapoyas in Peru, collected by Lobb; from Vitor, collected by Maclean; and from Patia Valley, 1000 to 1500 feet, and Magdalena Valley, near Garzon, in Columbia, collected by Mr. R. B. White. The first specimens from the latter were received in 1869. They were then recognised as probably new; but it was only in September 1895 that adequate material was received for a description (*see Kew Bulletin*, 1896, p. 22). Accompanying this Mr. White forwarded the following particulars :—

"A *Cæsalpinia* yielding a very fine Brazil wood, said by Prof. Oliver to be undescribed. The dye from this wood was ascertained by the late Daniel Hanbury to be superior to that yielded by the best Pernambuco Brazil wood."

In the Guide to Museum I. p. 55, it is stated that "Peach Wood, Brazil Wood and Lima Wood (dye woods) are usually attributed to *Cæsalpinia echinata*. The sources of these woods are, however, not satisfactorily known. Authentic specimens of leaves and flowers would be valuable." It is possible therefore that in *Cæsalpinia bicolor* we have a source of one of the above woods not yet recognised. Mr. White has been asked to forward specimens of the wood for the Museums of Economic Botany at Kew, and on the arrival of these, their value for dye purposes will then be tested.

New Method of treating the Vanilla Pod.—A communication, dated 22nd May last, has been received at the Foreign Office from Mr. Courtenay Bennett, Her Majesty's Consul at Réunion, inclosing extracts from the *Indépendant Créole* of Réunion, containing a paper read by M. Dolabartz, Manager in Réunion of the Crédit Foncier Colonial, at a recent meeting of the Réunion Syndicat Agricole upon a new process of treating the vanilla pod:—

According to M. Dolabartz the operation consists of drying the vanilla in an hermetically closed vessel by means of chloride of calcium in the proportion of about one kilog. for every kilog. of dried vanilla obtained. The chloride of calcium is not lost, as it can be easily regenerated by heating it in an iron or copper receptacle; one lot of chloride of calcium is thus sufficient for several processes if kept, after regeneration, in an hermetically closed vessel.

According to information received, 2·981 kilogs. of raw vanilla will produce about a kilog. of prepared vanilla.

It can be easily understood that vanilla dried in an air-tight vessel must lose much less vanilline than when dried by the ordinary process, by which it is exposed in the open air for several weeks. (*Board of Trade Journal*, August 1896.)